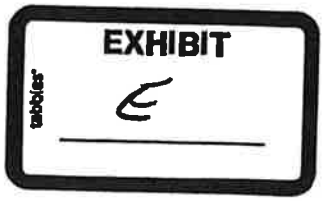
Expert Report of David A Swanson, Ph.D.

Expert in Demography for the Defendants.

White et al. v. Mississippi State Board of Election Commissioners et al.

5 January 2023



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I, David A. Swanson, affirm the conclusions I express in this report are provided to a reasonable degree of professional certainty.

EXPERT QUALIFICATIONS

1. I am an expert in demography with more than 50 years of experience. I have been retained on behalf of the State Board of Election Commissioners, Tate Reeves, in his official capacity as Governor of Mississippi, Lynn Fitch, in her official capacity as Attorney General of Mississippi, and Michael Watson, in his official capacity as Secretary of State of Mississippi, (hereinafter collectively "the Defendants") as an expert to provide analysis related to State Supreme Court redistricting litigation in the matter of *DYAMONE WHITE; DERRICK SIMMONS; TY PINKINS; CONSTANCE OLIVIA SLAUGHTER HARVEY-BURWELL, v. STATE BOARD OF ELECTION COMMISSIONERS; TATE REEVES in his official capacity as Governor of Mississippi; LYNN FITCH in her official capacity as Attorney General of Mississippi; MICHAEL WATSON in his official capacity as Secretary of State of Mississippi.*

2. I graduated with a Bachelor of Science in Sociology (with a minor in mathematics) from Western Washington University in 1972. I earned a graduate diploma in social sciences from the University of Stockholm in 1974, an M.A. in Sociology/Population Studies from the University of Hawai'i Mānoa in 1976 and a Ph.D. in Sociology/Population Studies from the University of Hawai'i Mānoa in 1985.

3. I have served in a number of professional association roles, including: general editor for Springer's Applied Demography series; member of the mortality expert panel of the Society of Actuaries Research Institute; Secretary-Treasurer (1995-7 and 2003-7) of the Southern Demographic association; and editor of *Population Research and Policy Review* (2004-7). More recently, I have been on the program committee for the 2022 annual meeting of the Population Association of America and also the program committees for the 2019 Conference on Population and Public Policy and both the 2020 and 2017 annual meetings of the Population Association of America. I have produced 115 refereed sole- and co-authored journal articles, and nine books. I also have edited or co-edited four additional books, with another on the COVID-19 pandemic forthcoming. Google Scholar shows more than 6,000 citations to my work (https://scholar.google.com/citations?user=t7P6qoYAAAAJ&hl=en&oi=ao).

4. My first demographic consulting job was in the spring and summer of 1972 with KVOS TV in Bellingham, Washington. While a graduate student at the Mānoa campus of the University of Hawai'i, I was employed as a staff researcher with the East-West Population Institute, a unit of the Congressionally funded East-West Center, which adjoins the Mānoa campus. In late 1976, I accepted a position with the Population,

Economic, and Enrollment Studies Division of the Washington State Office of Financial Management in Olympia, Washington (The Governor's Budget Office), and in 1981, I became the first State Demographer of Alaska. This was followed by private sector, government, and academic positions, to include serving as the State Demographer of Arkansas, Senior Scientist at Science Applications International Corporation, Dean at the Helsinki School of Economics and Business Administration (now part of Aalto University), and Professor & Chair of the Sociology/Anthropology Department at the University of Mississippi. I retired as Emeritus Professor of Sociology at the University of California Riverside in 2018 and was recognized as a "Dickson Professor Emeritus" in 2020-21. I have received a number of awards for my work, including two Fulbrights, and the 2022 "Terrie Award" for presenting the best paper (co-authored with two colleagues) on state and local demography at the annual meeting of the Southern Demographic Association (an award I also won in 1999 and 2016). I also have testified before Congress and State Legislatures and served on the U.S. Census Bureau's Scientific Advisory Committee, 2004-10, chairing it for two years. In November of 2022, I was nominated as one of the candidates to stand for election as the President of the Southern Demographic Association. I am currently a Research Associate (.25 FTE) with the Population Research Center, Portland State University.

5. Not only have I lived and worked in Mississippi, but my 115 refereed journal articles include studies dealing with demography, race, socio-economic status, and mortality in Mississippi (see, e.g., Swanson, 2008; Swanson and Cossman, 2020; Swanson and McGehee, 2009; Swanson and Sanford, 2012; Swanson and Verdugo, 2019). I also gave a recent paper describing the effect on the 2020 census of Mississippi of the Census Bureau's new Disclosure Avoidance System, "Differential Privacy" (Swanson and Cossman, 2021) and was a co-principal investigator on a 2005-6 grant funded by the National Science Foundation to study "Perceptions of Disaster Relief and Recovery: Analyzing the Importance of Social and Kinship Networks Among Hurricane Katrina Refugees on the Mississippi Gulf Coast," which led to a number of refereed journal articles (see, e.g., Chapel et al., 2007; Forgette et al., 2009; Henderson, et al., 2009; Swanson, 2008; Swanson, et al., 2007). I am a lifetime member of the Mississippi Academy of Sciences.

6. I have worked on redistricting cases (see paragraph 9 in this report for a list of these cases) as well as on revising school (K-12) attendance zones, an activity, which while lacking the legal underpinnings of legislative redistricting, shares similarities with the latter in terms of public consequences, analytical methods, GIS mapping, and variables such as age, race and socio-economic status as criteria of interest (Swanson et al., 1997; Swanson et al., 1998). Furthermore, as indicated in the dedication and

acknowledgments, respectively (Morrison and Bryan, 2019: viii, xi), I also played an active role in the development of *Redistricting: A Manual for Practitioners, Analysts, and Citizens*.

7. I been involved in the following court cases as a testifying and/or deposed expert witness:

   - Deposed Expert Witness (testimony expected to be given in April, 2023). 2022. Case No. CV 6417-300, Superior Court of Arizona in and for the County of Apache, General Adjudication of All Rights in the Little Colorado River System and Source, Phoenix, AZ (On behalf of the Hopi Tribe, Review of Population Forecasts done by a Demographer hired by the Navajo Nation). Osborne Maledon, P.A., Phoenix, AZ;
   - Deposed and Testifying Expert Witness. 2022. Case A-17-762364-C. Estate of Joseph P. Schrage Jr & Kristina. D. Schrage v. Allan Stahl. Eighth Judicial Court, Clark County, Las Vegas, Nevada (life expectancy, working life expectancy and present value of lost earnings and benefits). O'Reilly Law Group, Las Vegas, NV;
   - Deposed and Testifying Expert Witness. 2021. Case No. CV 6417-203, Superior Court of Arizona in and for the County of Apache, General Adjudication of All Rights in the Little Colorado River System and Source, Phoenix, AZ (Forecast of Hopi Tribal Population). Osborne Maledon, P.A., Phoenix, AZ;
   - Deposed and Testifying Expert Witness. 2012. Board of Education, Shelby County, Tennessee et al. v. Memphis City Board of Education et al. / Board of County Commissioners, Shelby County, Tennessee (third party plaintiff) v. Robert E. Cooper et al (third party defendant)." (Constitutionality of a Tennessee state law). (School District Enrollment Forecasts). Baker, Donelson, Bearman, Caldwell and Berkowitz, PC. Memphis, TN;
   - Deposed Expert Witness. 2009. "Quest Medical Services v. FMIC." (Demographic Effects of Hurricane Katrina on New Orleans in a case involving a Medical Service Provider). Podvey, Meanor, Catenacci, Hildner, Cocoziello, and Chattman, P.C., Newark, NJ;
   - Deposed and Testifying Expert Witness. 2007. "Spring Hill Hospital, Inc. v. Williamson Medical Center and Maury Regional Hospital." (Evaluation of population forecasts in a case involving a proposed hospital). Miller and Martin, PLLC, Nashville;
   - Deposed and Testifying Expert Witness. 1994. Arkansas Supreme Court. (Statistical evaluation of the accuracy of the number of qualified signatures on a public referendum as determined by a sample); and
   - Deposed Expert Witness. 1983. "Anchorage, et al., vs. J. Hammond et al." (Lawsuit brought by local governments against the state of Alaska on how populations are determined for purposes of state revenue sharing to local governments).

8. I produced the following expert reports as a consultant/potential expert witness in other court cases:

   - Expert Report, Estimated Life Expectancy and Present Value of Household Costs, Z. Kirkson. O'Reilly Law Group, Las Vegas, Nevada. (2019);

     Expert Report, The Potential Number of Claimants in regard to the 2010 Gulf of Mexico Oils Spill and its Sequellae. Watts Guerra, LLC. San Antonio, TX. (2016);

   - Expert Report in the matter of Conseil scolaire francophone de la Colombie-Britannique, Fédération des parents francophones de Colombie-Britannique, et al. v. Her Majesty the Queen in Right of the Province of British Columbia, and the Minister of Education of the Province of British Columbia, Vancouver Registry S103975 in the Supreme Court of British Columbia. Prepared for the Office of the Attorney General, Ministry of Justice, Province of British Columbia, Canada (2014);

   - Expert Report re Title Insurance Loss Model, First American Title Insurance Company, Miller and Martin PLLC, Nashville, TN (2008);

   - Expert Report re Patient Population in the matter of Ochsner Clinical Foundation versus Continental Casualty Company. Fisher and Kanaris PC, Chicago, IL (2008); and

   - Expert Report re Hurricane Katrina: Its Impacts on the Population and Candidates for Endovascular Surgery in the Primary and Secondary Service Areas of Garden Park Hospital as Defined by Hospital Corporation of America. Salloum and Brawley LLP, Nashville, TN (2007).

9. I have served as a consultant to BryanGeoDemographics (BGD) in regard to the following redistricting cases:

   - Singleton v. Morrill, Case 2:21-CV-01291-SGC;
   - Robinson v. Ardoin, Civil Action Nos. 22-211-SDD-SDJ, 22-214-SDD-SDJ;
   - McConchie v. State Board of Elections, No. 1:21-CV-03091; and
   - Caster v. Merrill, Case No. 2:21-CV-1535-AMM.

10. Because of its expertise and experience, I have used the services of Bryan Geodemographics, which under my direction has assembled data, maps and other work products.

11. My full Curriculum Vitae, including my 50 years of demography experience, is attached as Appendix 6.

12. I am being compensated at a rate of $400/hour.

I. EXECUTIVE SUMMARY

13. The *White et al.* case has been brought with the support of numerous expert reports. One of these reports was authored by Mr. William Cooper, whose report included a demographic analysis of the existing SCOMS districts, plus four new proposed alternative districts (including analysis of their characteristics). I will be referring to Mr. Cooper's report throughout my paper. Mr. Cooper's report relies on the use of 2020 voting age population (VAP) – a measure which he uses to argue that MS SCOMS District 1 is a *minority* Black district at 49.3% (see Cooper report at p.19). The appropriate measure would actually be the *citizen* voting age population (or CVAP). That is, the population actually eligible to vote. In regard to the existing Supreme Court of Mississippi (SCOMS) Districts, as shown in *Table III.E.2 2020 Census Voting Age Population for Existing SCOMS Districts* District 1 already has a Black (Citizens of Voting age Population) CVAP majority at 51.0% APB, a fact Mr. Cooper fails to note in his report. Cooper's Illustrative Plan 1 would increase the Black (Any Part Black, "APB") CVAP majority in District 1 to 57.0%, while Illustrative Plan 2 would raise the CVAP %APB to 55.4%, Least Change Plan 1 would raise the CVAP %APB to 54.4%, and Least Change Plan 2 would raise the CVAP %APB to 53.8%. Each of Cooper's plans yield a similar result: an already Black CVAP APB majority in District 1 is increased to a higher level.

14. When compared to the existing Supreme Court Districts, all four of Cooper's alternative plans serve to lessen the diversity of both the White non-Hispanic (WNH) and the APB CVAP populations across the three districts relative to the distribution of the Citizens of Voting Age Population (CVAP) as a whole. As such, the existing Supreme Court districts provide more diversity than do any of Cooper's plans.

15. Cooper does not analyze the existing SCOMS districts or his own alternative districts by traditional redistricting criteria. However, I use two of them to analyze the existing districts and those proposed by Cooper: core retention and compactness. Briefly, core retention is the principle that the core (population) of prior districts be maintained in a redistricting plan and Compactness is the principle that the distance between all parts of a district is minimized (Gallagher, Kreye and Duros, 2020: 14). Core retention is a critical measure in assessing alternate redistricting plans, because it reveals the *gross* changes in each population that was made to achieve the *net* change of the plan. In the cased of Cooper's illustrative plans, I find that significant gross amounts of population are moved around the state in order to achieve the minimal increase in % Black he proposes in his two new illustrative District 1 scenarios. Core retention of the APB CVAP population in Cooper's two illustrative plans is low, only 72.0% overall and 76.9% of APB VAP in District 1 are retained in his Illustrative Plan I and 65.7% overall and 68.6% of APB VAP are retained in his Illustrative Plan II. These core retention

statistics differ from those of the WNH population and the population as a whole. This finding is consistent with my finding that Cooper's plans serve to decrease diversity across the Supreme Court districts. Cooper's two "least change" plans provide higher levels of retention: 89.2% overall and 91.7% in District 1 of APB VAP in his Least Change Plan 1; and 93.6% overall and 97.0% of District 1 in his Least Change Plan II.

16. Concurrent with the requirement to use counties to build districts for legislative districts, Mississippi law also requires legislative districts to be compact (See Paragraph 60 in this report). Cooper implicitly acknowledges the importance of compactness by asserting that his proposed plans meet compactness criteria. His plans are compact because he asserts they are. However, he fails to calculate and show any compactness measures supporting this assertion. Using the Reock, Polsby-Popper, Schwartzberg and Convex Hull measures, I calculated the compactness of each district under the existing plan and each of Cooper's four plans. At an aggregate level, the existing SCOMS plan is the most compact among the five plans analyzed. SCOMS existing District 1 is the most compact District 1 configuration. Cooper's Least Change Plan 1 District 2 yields the most compact District 2 configuration, and Cooper's Least Change Plan 2 District 3 is the most compact District 3 configuration. While there are individual districts that are more compact in Cooper's plans by different compactness measures, each of the alternate plans suggested by Cooper range from somewhat less compact to substantially less compact overall than is offered by the existing SCOMS plan.

17. The boundaries of the existing SCOMS districts not only serve as the geographic basis for elections to the state's Supreme Court, they serve as the geographic basis for elections to the State Transportation Commission and the Public Service Commission. They also serve as the geographic basis for appointments to both the Mississippi Board of Bar Admissions and the Board of Trustees for the State Institutions of Higher Learning (IHL), as well as a number of other boards, to include, per a list provided by the State Attorney General's Office: ABLE Board of Directors (MISS. CODE ANN. § 43-28-7); State Board of Banking Review (MISS. CODE ANN. § 81-3-12); Charter School Authorizer Board (MISS. CODE ANN. § 37-28-7); Board of Cosmetology (MISS. CODE ANN. § 73-7-1); Board of Education (MISS. CODE ANN. § 37-1-1); Electronic Protection Licensing Advisory Board (MISS. CODE ANN. § 73-69-21); Board of Licensure for Professional Engineers and Surveyors (MISS. CODE ANN. § 73-13-5); State Board of Funeral Service (MISS. CODE ANN. § 73-11-43); Mississippi Home Corporation (MISS. CODE ANN. § 43-33-704); Hospital Equipment and Facilities Authority (MISS. CODE ANN. § 41-73-7); Land, Water and Timber Resources Board (MISS. CODE ANN. § 69-46-3); State Board of Medical Licensure (MISS. CODE ANN. § 73-43-3); Board of Nursing Home Administrators

(MISS. CODE ANN. § 73-17-7); Oil and Gas Board (MISS. CODE ANN. § 53-1-5); MS State Personnel Board (MISS. CODE ANN. § 25-9-109); State Board of Veterinary Medicine (MISS. CODE ANN. § 73-39-55. The IHL has a policy that acknowledges the value of diversity for Mississippi, as does an opinion written by Judge William Barbour in the "Magnolia Bar" case and, in addition, a statement by the ACLU in regard to this case. Using indices from the Mississippi Health and Hunger Atlas, I find that the existing Supreme Court Districts provide more population diversity than do any of Cooper's four alternative plans and that Cooper's plans serve to decrease population diversity across the Supreme Court districts.

18. In the Plaintiffs' expert report by Dr. Traci Burch, it is asserted that Mississippi's Black voters are currently disenfranchised. A general assertion in Dr. Burch's report (Figure 4 and accompanying text in her report and *Exhibit IV.A.4 Racial Differences in Voter Turnout and by Education Level* herein) is that White Mississippians turned out to vote in the 2020 election at a higher rate than Black Mississippians, 56.1% to 53.0%, respectively. Dr. Burch's finding is the result of a flawed analysis in which she employed the incorrect "universe" as the denominator in her calculations (the entire population, which includes those under age 18) rather than the correct "universe," the population eligible to vote ("Citizens of Voting Age Population" - CVAP). In referencing the officially published US Census Bureau tables published from the same source she cites (the 2020 Current Population Survey, November Voting supplement found in *Table IV.A.2 2020 Mississippi Voting by Race and Ethnicity*), I find that that when the correct universe, CVAP, is used as the denominator, APB Mississippians turned out at a *higher* rate in the 2020 election than WNH Mississippians: 72.9% to 69.8%. Additionally, I find her estimate of 53.0% "Black Alone or in Combination, non-Hispanic" to be incorrectly calculated.

19. As shown by data from past November Voting Supplements in the Current Population Survey (taken in the even numbered years when federal elections are held, starting in 1964), my finding is consistent with the trend of voting seen in Mississippi since 2004. Except in 2010, both the percent of Black CVAP registered and the percent of Black CVAP voting have been higher in *every survey year* than the percent of WNH CVAP registration and voting, respectively (see *Figures IV.A.1* and *IV.A.2* in this report). In conjunction with this 21st century trend, my finding in regard to the 2020 election also reveals that Dr. James T. Campbell's implication (p. 51 of his report) that Black Mississippians currently register and vote at lower rates than White Mississippians also is mistaken:

> "Under the circumstances prevailing in Mississippi today, and in light of the history from which those circumstances originate, it is my opinion that Black

> Mississippians are not afforded an equal opportunity to elect candidates of their choice in Supreme Court elections."

20. The Voting Supplements of the Current Population Survey (CPS) from 2004 to 2020 do not support Dr. Campbell's opinion. Moreover, the voter registration data in the Voting Supplements of the CPS are consistent with voting registration data collected for Mississippi in sample surveys conducted annually from 2015 to 2021 by the Survey Research Laboratory, Social Science Research Center, Mississippi State University (SSRC). These sample surveys show that for each year, 2015 to 2021, the percent of Black Mississippians age 18 and over who are registered to vote is higher than the percent of White Mississippians age 18 and over who are registered to vote. In addition, the SSRC sample surveys show that for each year, 2015 to 2021, the percent of Black Mississippians aged 18 and over who report "Always Vote" is higher than the percent of White Mississippians age 18 and over who report "Always Vote." Both the CPS and the SSRC data are consistent with a finding reported for the first time in this report: Statewide, a higher share of the Black population of potential and actual voters is within a quarter mile of a polling place than is the case for the White population of potential and actual voters, an indicator of opportunity for actual and potential Black voters. Moreover, the CPS shows that Black Voter turnout is higher than that of White Voters, a finding consistent with SSRC data.

II. ASSIGNMENT

21. On behalf of the Defendants, I have been asked to independently review and assess the features and characteristics of Mississippi's Supreme Court voting district plan along with plans and reports submitted by White et al. (Plaintiffs), as appropriate to my training, experience and background.

22. In **Section III,** I analyze Supreme Court Districts as well as the state as a whole in terms of population and voting data. I provide an assessment of: First, compliance of the Mississippi Supreme Court plan with redistricting requirements; then, second, core retention, and compactness as outcomes. I also assess the population diversity of the districts using health and hunger indices developed by the University of Mississippi for the state's counties. These indices are themselves correlated with socio-economic status and race.

23. In **Section IV,** I provide an in-depth analysis of Mississippi voter registration and voter turnout statistics and trends using:

- November Voting Supplement of the U.S. Census Bureau's Current Population Survey;
- Mississippi county-specific voter registration and voting frequency data by race from annual statewide surveys conducted from 2015 to 2021 by the Survey Research Laboratory of the Social Science Research Center (SSRC) at Mississippi State University.

24. In **Section V,** I provide Appendices.

25. In forming my opinions, I have considered all materials cited in this report and the appendices. I have also considered some pleadings and other filings in this matter; materials, to include, P. Morrison & T. Bryan, *Redistricting: A Manual for Analysts, Practitioners, & Citizens* (Springer 2019); and U.S. DOJ, Guidance under Section 2 of the Voting Rights Act, 52 U.S.C. 1301, for redistricting and methods of electing government bodies (Sept. 1, 2021). The population, voter registration, and voter turnout, data I use in this report are from standard sources used by demographers, to include census and survey data from the U.S. Census Bureau, as well as survey data from the Social Science Research Center, Mississippi State University. In using these data, I engaged the services of Bryan Geodemographics, an organization experienced in the assembly, summarization, and visualization of demographic and related data, which performed these activities under my direction.

26. I reserve the right to further supplement my report and opinions.

III. CHARACTERISTICS OF MISSISSIPPI SUPREME COURT DISTRICTS

A. Decennial Census

27. The Decennial Census counts people in the United States on a De Jure basis (Wilmoth, 2004: 65) and the U.S. Census Bureau attempts to count everybody once, only once, and in the right place (Cork and Voss, 2006). It is mandated by the Constitution to occur every 10 years, in years ending in zero, to provide the numbers needed to reapportion the House of Representatives, which also results in a reapportionment of the Electoral College. The decennial census numbers also are used by state governments to redraw legislative districts, and the federal government uses the numbers in various funding formulas to distribute some $1.504 trillion in funding for highways, hospitals, schools, and many other purposes (Sullivan, 2020: 1).

28. In order for states to redraw legislative and other districts, the U.S. Census Bureau issues the "PL 94-171 "redistricting data" file in conjunction with the decennial census.[1] Because the decennial census itself does not ask a "citizenship" question and also does not include questions about voting activities, other sources of data produced by the U.S. Census Bureau for itself or for other federal agencies are often used in redistricting activities, to include the PL 94-171 redistricting file, the American Community Survey and the Current Population Survey (Morrison and Bryan, 2019). It is not always the case that the counts or percentages of the same conceptual variables across these different sources will match exactly (Swanson and Van Patten, 1987; U.S. Census Bureau, 2020b: 17-19).

B. Mississippi Population Characteristics

29. Compared to the U.S. as a whole, Mississippi is not as diverse in terms of race and ethnicity. According to the U.S. Census Bureau[2], Mississippi has a 2020 population of 2,961,279 of which: 1,084,481 are Black Alone (36%); 1,658,893 are White Alone (56%); 32,701 are Asian (1%); 16,450 are American Indian or Alaskan Native (0.5%); and 56,860 are "Other" (1.9%). In the 2020 Census, 110,732 Mississippians reported being "two or more races" (3.7%) and 105,220 reported being Hispanic or Latino (3.6%). For the U.S. as a whole: approximately 12.4% of its 2020 population of 331,449,281 is "Black Alone;" 62% is "White Alone;" 5.9% is Asian; 1.1% is American Indian or Alaskan Native; and 8.4% is "other." In the 2020 Census, 33,898,993 Americans reported being "two or more races" 10.2%) and 62,080,044 reported being Hispanic or Latino (18.7%). In Mississippi, 92% of its 2020 population

[1] https://www.census.gov/programs-surveys/decennial-census/about/rdo/summary-files.html

[2] https://data.census.gov/cedsci/profile/Mississippi?g=0400000US28

is either "Black Alone" or "White Alone," while in the U.S, 74% of its 2020 population is either "Black Alone" or "White Alone," making Mississippi less racially diverse than the U.S. as a whole. With only 3.6% of its population identifying themselves as Hispanic or Latino, Mississippi is less ethnically diverse than the U.S. as a whole, where 18.7% identify themselves as Hispanic or Latino.

C. Mississippi Supreme Court Geography

30. Mississippi's three Supreme Court election districts are designated along county boundaries, with 22 counties in Supreme Court District 1, 27 counties in District 2, and 33 counties in Supreme Court District 3 – as shown in Appendix 4 Map A. There are 82 counties in Mississippi. Each county is of varying population, ranging from a high of 222,679 in Hinds County, to a low of 1,280 in Issaquena County.[3] All counties in Mississippi are functioning governmental entities, each governed by a board of supervisors and 10 of them have two county seats.[4] Counties appear to have been foundational in the development and maintenance of MS Supreme Court Districts since their inception.[5] Three justices are elected for eight year terms in staggered fashion from each of the three Supreme Court Judicial Districts.[6] An inventory of county assignments to districts from different plans and the cluster analysis herein may be found in Appendix 1A.

31. Appendix 4 Map A shows the current SCOMS District boundaries. These districts serve more than one purpose. They not only form the geographic basis for elections to the Mississippi State Supreme Court, but also for elections regarding the Transportation Commission and the Public Service Commission (Campbell, 2022): In addition they serve as the geographic basis for (1) appointments to the Board of Bar Admissions[7]; (2) the Board of Trustees for the State Institutions of Higher Learning (IHL); and (3) boards identified in paragraph 17. In regard to IHL, four of the 12 Member Board of Trustees for the State Institutions of Higher Learning are appointed by the Governor from each of the three Supreme Court districts.[8] The IHL Board Office is responsible for policy and financial oversight of the eight public institutions of higher learning in

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[3] https://www.mississippi-demographics.com/counties_by_population

[4] https://www.mssupervisors.org/mississippi-counties

[5] Provided by MS Attorney General's Office: a copy of "The Code of Mississippi, 1848, Article 11, An Act to Regulate the Districts for the Election of Judges of the High Court of Errors and Appeals and to Change the Terms of Said Court."

[6] https://courts.ms.gov/appellatecourts/sc/sc.php

[7] https://courts.ms.gov/news/2020/10.12.20Board%20of%20Bar%20Admissions.php

[8] http://www.mississippi.edu/board/

Mississippi.[9] The Board's policy statement 102.06 acknowledges the value of diversity for Mississippi.[10] Given that Mississippi is less racially and ethnically diverse than the U.S. as a whole, this is an important policy statement for the state, one not only in line with a statement by the ACLU (2022) in regard to this case but also the 1992 "Magnolia Bar" case concerning the SCOMS districts, in which Judge William Barbour's decision acknowledged the defendants claim that the existing SCOMS districts foster political and socio-economic diversity (Barbour, 1992: line 1417). Any changes that impact the SCOMS districts would have implications not only for the elections regarding the Supreme Court, but also elections for the Transportation Commission and Public Service Commission. In addition, they will impact appointments to the Board of Bar Admissions and the Board of Trustees for the State Institutions of Higher Learning.

D. Mississippi Supreme Court Census Population

32. Using the 2020 Census, there are three important population definitions I use to characterize each of the districts. I start with the voting age population (VAP), within which is the White, non-Hispanic population (WNH) and then the any part Black population (APB). Other minority populations such as Asian, Native Hawaiian and Pacific Islander, American Indian Alaskan Native and "Other" are relatively small in Mississippi and, therefore, not central to this report.[11] The Hispanic population is relevant only insofar as they own a disproportionately large share of non-citizen population, and therefore largely explain the differences between VAP and CVAP estimates. As part of its demographic reporting, the US Census Bureau provides numerous statistics for each race alone and in combination, and also by ethnicity (whether an individual is of Hispanic origin or not). Therefore, an individual could be Black Alone, Black and White or any number of other combinations with other races and ethnicity. For the purpose of this examination, I am using the "Any Part Black" (the "APB" definition). The APB population is used in the plaintiffs' analysis and is outlined by the Department of Justice in their guidance for defining populations in VRA cases.[12] The DOJ Guidance on Federal Statutes Regarding Redistricting and Methods for Electing Public Officials states:

> "The Department of Justice will follow both aggregation methods defined in Part II of the Bulletin. The Department's initial review will be based upon allocating any response that includes White and one of the five other race categories identified in the response. Thus, the total numbers for "Black/African American,"

[9] http://www.mississippi.edu/board/

[10] http://www.mississippi.edu/board/downloads/policiesandbylaws.pdf

[11] https://data.census.gov/table?q=p1&g=0400000US28

[12] https://www.justice.gov/opa/press-release/file/1429486/download

> "Asian," "American Indian/Alaska Native," "Native Hawaiian or Other Pacific Islander," and "Some other race" reflect the total of the single-race responses and the multiple responses in which an individual selected a minority race and White race."
>
> The Department will then move to the second step in its application of the census data by reviewing the other multiple-race category, which is comprised of all multiple-race responses consisting of more than one minority race. Where there are significant numbers of such responses, the Department will, as required by both the OMB guidance and judicial opinions, allocate these responses on an iterative basis to each of the component single-race categories for analysis. Georgia v. Ashcroft, 539 U.S. 461, 473, n.1 (2003)"[13]

33. In *Table III.D.1* (below) one can see that Mississippi's 2020 Voting Age Population (VAP) was 2,277,599 per the 2020 Pl 94-171 redistricting file and when divided into the three SCOMS districts shows 716,402 in District 1 (31% of the total VAP), 796,767 in District 2 (35% of the total VAP), and 764,430 in District 3 (34% of the total VAP), a fairly equitable distribution. As can be seen in this table, approximately 45% of the VAP in District 1 is made up of WNH total and 49.3% of APB total. It is this number, 49.3%, that the Plaintiffs are relying on to characterize D1 as being minority Black. In District 2, approximately 65% of VAP is made up of WNH total while 28% is made up of APB total. In District 3, 62% of the VAP is made up of WNH total with 33% made up of APB total. Clearly, District 1 has the highest percent of APB total of the three while Districts 2 and 3 are clearly majority WNH total.

Table III.D.1 2020 Census Voting Age Population for Existing SCOMS Districts[14]

Existing Districts	VAP	WNH Total	APB Total	% WNH	% APB
1	716,402	324,908	353,091	45.4%	49.3%
2	796,767	517,385	220,412	64.9%	27.7%
3	764,430	473,158	249,577	61.9%	32.6%
Total	**2,277,599**	**1,315,451**	**823,080**	**57.8%**	**36.1%**

Source: 2020 Census PL94-171; calculations by Bryan GeoDemographics for author.

[13] https://www.justice.gov/opa/pr/justice-department-issues-guidance-federal-statutes-regarding-redistricting-and-methods

[14] These statistics correspond in part to those presented in Mr. Cooper's expert declaration: Figure 2: Mississippi – 1990 to 2020 Census Percent Voting Age Population by Race and Ethnicity on P.9.

34. A useful way to look at the distribution of WNH total and APB total across the three districts is to use the coefficient of variation (*CV*). Because the *CV* is a dimensionless number, it can be used to make comparisons across populations with different means (Swanson, 2012: 86). To get to this measure, one starts by computing the mean VAP and its standard deviation across the three districts, which yields 759,199.67 (where 759,199.67 = 2,277,599/3) and a standard deviation of 33,016.67. If each of the three districts had the same number of VAP (approximately 759,200), the standard deviation would be essentially zero. The actual population standard deviation is 33,016.67. When the standard deviation is divided by the mean, one obtains the coefficient of variation (*CV*), which shows the extent of variation relative to the mean. In this case, the *CV* is approximately 0.04 (where 0.04 = 33,016.6/759,199.67). In this regard, I compare the *CV*s for VAP (0.04), WNH total (0.19), and APB total (0.21). The WNH total is about four times higher than that seen for VAP and the APB total is approximately five times higher than that that seen for VAP, which serves to confirm that WNH total and APB total population are less equally distributed across the three districts than the total VAP, irrespective of their means.

35. The plaintiffs put forth four potential alternative plans,[15] each with different features. Using the same procedure I applied to the existing plan (*Table III.D.1* above), I summarize the demographic characteristics of each of these four alternative plans. As shown in *Table III.D.2* (below) for Cooper's Illustrative Plan 1, one can see that Mississippi's 2020 Voting Age Population (VAP) is 2,277,599 per the 2020 Pl 94-171 redistricting file (consistent with the VAP reported in *Table III.D.1* above) . The new District 1 has 40.9% WNH and 55.3 % of APB. This represents an increase of +6.0 percentage points (55.3% - 49.3%) APB in this district over the existing plan. In District 2, 68.3% of VAP is made up of WNH while 23.5% is made up of APB. In District 3, 63.4% of the VAP is made up of WNH with 30.3% made up of APB. Clearly, District 1 has the highest percent of APB of the three while Districts 2 and 3 are clearly majority WNH.

[15] Mr. Cooper's expert declaration:

- Figures 10 and 11: Illustrative Plan 1 on P.27
- Figures 13 and 14: Illustrative Plan 2 on P.30
- Figures 15 and 16: Least Change Plan 1 on P.33 and P.34
- Figures 17 and 18: Least Change Plan 2 on P.35

Table III.D.2 2020 Census Voting Age Population for Cooper Illustrative Plan 1 Districts

Illustrative 1	VAP	WNH Total	APB Total	% WNH	% APB
1	737,689	301,664	407,999	40.9%	55.3%
2	757,569	517,762	178,124	68.3%	23.5%
3	782,341	496,025	236,957	63.4%	30.3%
Total	**2,277,599**	**1,315,451**	**823,080**	**57.8%**	**36.1%**

Source: 2020 Census PL94-171; calculations by Bryan GeoDemographics for author.

36. As shown in *Table III.D.3* (below) for Cooper's Illustrative Plan 2, one can see that the new District 1 has 41.4% WNH and 54.2 % of APB. This represents an increase of +4.9 percentage points (54.2% - 49.3%) APB in this district over the existing plan. In District 2, 65.9% of VAP is made up of WNH while 26.4% is made up of APB. In District 3, 65.5% of the VAP is made up of WNH, with 28.3% made up of APB. Again, District 1 has the highest percent of APB of the three while Districts 2 and 3 are clearly majority WNH.

Table III.D.3 2020 Census Voting Age Population for Cooper Illustrative Plan 2 Districts

Illustrative 2	VAP	WNH Total	APB Total	% WNH	% APB
1	746,385	309,225	404,440	41.4%	54.2%
2	760,360	500,934	200,715	65.9%	26.4%
3	770,854	505,292	217,925	65.5%	28.3%
Total	**2,277,599**	**1,315,451**	**823,080**	**57.8%**	**36.1%**

Source: 2020 Census PL94-171; calculations by Bryan GeoDemographics for author.

37. As shown in *Table III.D.4* (below) for Cooper's Least Change Plan 1, one can see the new District 1 has 42.1% WNH and 53.0 % of APB. This represents an increase of +3.7 percentage points (53.0% - 49.3%) APB in this district over the existing plan. In District 2, 66.0% of VAP is made up of WNH while 26.5% is made up of APB. In District 3, 64.1% of the VAP is made up of WNH with 30.1% made up of APB. Again, District 1 has the highest percent of APB of the three while Districts 2 and 3 are clearly majority WNH.

Table III.D.4 2020 Census Voting Age Population for Cooper Least Change Plan 1 Districts

Least Change 1	VAP	WNH Total	APB Total	% WNH	% APB
1	722,892	304,436	383,099	42.1%	53.0%
2	766,360	505,954	202,788	66.0%	26.5%
3	788,347	505,061	237,193	64.1%	30.1%
Total	**2,277,599**	**1,315,451**	**823,080**	**57.8%**	**36.1%**

Source: 2020 Census PL94-171; calculations by Bryan GeoDemographics for author.

38. As shown in *Table III.D.5* (below) for Cooper's Least Change Plan 2, one can see the new District 1 has 43.3% WNH and 52.0 % of APB. This represents an increase of +2.7 percentage points (52.0% - 49.3%) APB in this district over the existing plan. In District 2, 64.9% of VAP is made up of WNH while 27.7% is made up of APB. In District 3, 64.5% of the VAP is made up of WNH with 29.5% made up of APB. Again, District 1 has the highest percent of APB of the three while Districts 2 and 3 are clearly majority WNH.

Table III.D.5 2020 Census Voting Age Population for Cooper Least Change Plan 2 Districts

Least Change 2	VAP	WNH Total	APB Total	% WNH	% APB
1	738,384	319,492	383,997	43.3%	52.0%
2	796,767	517,385	220,412	64.9%	27.7%
3	742,448	478,574	218,671	64.5%	29.5%
Total	**2,277,599**	**1,315,451**	**823,080**	**57.8%**	**36.1%**

Source: 2020 Census PL94-171; calculations by Bryan GeoDemographics for author.

E. ACS Citizen Voting Age Population Characteristics of Mississippi

39. Each of the plans put forth by the plaintiffs are as remarkable for their features and what they say about them, as what they do not. Conventionally, when a Gingles 1 analysis is done, it includes an analysis not just of the VAP, but of the Citizen VAP (or, "CVAP") as well. Conceptually, the CVAP is a refined measure, withdrawing those who may be of voting age – but by virtue of not being citizens are ineligible to vote. In recent cases, Mr. Cooper includes this important measure.[16] In this case, however, Mr. Cooper does not. Why, one must ask is this the case? As noted in the executive summary, the APB Black CVAP is already a majority at 51.0%. This fact that District 1 is an existing "majority-minority district is contrary to plaintiffs' claim that the SCOMS District 1 is a minority district in need of remediation.

40. The American Community Survey (ACS) is the source of record for CVAP data. The survey is a set of "rolling" sample surveys conducted by the U.S. Census Bureau (Morrison and Bryan, 2019; US Census Bureau, 2020a). It is distinct and different from the Decennial Census and the Current Population Survey, which also are conducted by the U.S. Census Bureau. The ACS provides data that the US Department of Justice commissions and relies on for adjudicating VRA cases.[17] For the purposes of cases just like these, the US Census Bureau began tabulating CVAP data starting back in 2002, and currently produces a new specially tabulated CVAP dataset each year at the request of the US DOJ.[18] The output of this file is composed of estimates of the CVAP by race and ethnicity for different levels of Census geography, as follows:[19]

> "This is a special tabulation of the citizen voting age population and other data from the 2016-2020 5-year American Community Survey (ACS). This is the twelfth release of this special tabulation of ACS data. The first release used the 2005-2009 5-year ACS data, and the data are re-released every year using each subsequent year's 5-year ACS data. These special tabulations provide citizenship voting age data to assist the redistricting process. Data from this and all previous releases are available through the Voting Rights link on the Census Bureau's Redistricting Data Office web site, www.census.gov/rdo."

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[16] See Second Declaration of William S. Cooper in Alabama *Caster v. Merrill* and Exhibit 1 - Decl. of William S. Cooper in *Robinson v. Ardoin* and *Galmon v. Ardoin* and related Louisiana redistricting litigation in 2022 both current SCOTUS cases where he reports and discusses CVAP alongside VAP and its importance in measuring minority populations.

[17] Morrison, P. and T. Bryan (2019). Redistricting: A Manual for Analysts, Practitioners, and Citizens. Springer. Cham, Switzerland

[18] https://www.census.gov/programs-surveys/decennial-census/about/voting-rights/CVap.html

[19] https://www2.census.gov/programs-surveys/decennial/rdo/technical-documentation/special-tabulation/CVAP_2016-2020_ACS_documentation_v3.pdf

41. The US Census Bureau reports a variety of CVAP statistics as part of this special tabulation, including data in total as well as by select racial and ethnic groupings – as seen in *Exhibit III.E.1* (below).

Exhibit III.E.1 American Community Survey DOJ VRA Race and Ethnicity Reporting Classifications

1	Total CVAP
2	Not Hispanic or Latino (NH)
3	American Indian or Alaska Native Alone (NH)
4	Asian Alone (NH)
5	Black or African American Alone (NH)
6	Native Hawaiian or Other Pacific Islander Alone (NH)
7	White Alone (NH)
8	American Indian or Alaska Native and White (NH)
9	Asian and White (NH)
10	Black or African American and White (NH)
11	American Indian or Alaska Native and Black or African American (NH)
12	Remainder of Two or More Race Responses (NH)
13	Hispanic or Latino

Source:https://www2.census.gov/programs-surveys/decennial/rdo/technical-documentation/special-tabulation/CVAP_2016-2020_ACS_documentation_v3.pdf.

42. As discussed in the Mississippi Supreme Court Census Population section above, the DOJ directs that two levels of minority population be produced. In order to create the first-level required DOJ estimate of the Black or African American population, group 5 Black or African American Alone (NH) and group 10 Black or African American and White (NH) are aggregated. In recent cases, this level has proven just to be a demographic exercise. Plaintiffs in cases such as these are commonly going straight to the second-level definition, as follows.

43. In order to create the second-level required DOJ estimate of the any-part Black or African American population, the following are aggregated, group 5 Black or African American Alone (NH) and group 10 Black or African American and White (NH) and group 11 American Indian or Alaska Native and Black or African American (NH). The American Indian or Alaska native combination is the only other Black or African American combination reported.

44. The DOJ does not outline which one of numerous demographic methods they recommend to "allocate these (multi-race) responses on an iterative basis" nor do they

provide the multi-race granularity of reporting afforded by the Decennial Census. While there are more Black or African American population in the ACS in the "Remainder of Two or More Race Responses" category – there is no way to estimate this from the data that the DOJ requests from the Census Bureau to fulfill their own definitions. In this regard, one can think of the estimates provided by Black or African American Alone (NH) and Black or African American and White (NH) and American Indian or Alaska Native and Black or African American as a lower bound of the actual any-part Black CVAP being reported.

45. Again, we have two sources of population data: (1) the Decennial Census from 2020 (Total and Voting Age Population, or "VAP"); and (2) the most recent ACS from 2016-2020 (Citizen Voting Age Population, or "CVAP"). Plaintiffs claim the existing District 1 is a minority district based on 2020 Census VAP data – at 49.3%. Plaintiffs do not present the measure used by their own expert in other cases to measure actual voting strength: CVAP. Cooper's analysis only reports results from the 2020 Decennial Census, which shows a 49.3% VAP bare minority share in existing Supreme Court District 1. When you remove the non-Citizens then examine APB as a share of CVAP the conclusion is different - Supreme Court District 1 is an APB CVAP majority at 51.0% as shown in *Table III.E.2* (below).

46. As long as I am focusing on the population eligible to vote, I need to acknowledge and address the prison populations in Mississippi, where many of the residents are ineligible to vote. It is important to note that the ACS Citizen Voting Age Population, or "CVAP" includes group quarters (e.g. prisons) populations, some of whom are ineligible to vote. The state of Mississippi has three large correctional facilities, which house overwhelmingly Black populations. The Mississippi State Penitentiary, "Parchman" (MSP in Sunflower County), Central Mississippi Correctional Facility (CMCF in Rankin County); and the Southern Mississippi Correctional Institution (SMCI in Greene County) – as shown in Appendix 4 Map B. It is my opinion that because of the size of these facilities, and the share of them that are Black, any analysis is at risk of the misrepresenting CVAP members who are actually eligible to vote. In order to give the Plaintiffs every benefit of the doubt using the CVAP measure – my analysis excludes the estimated Black prisoner population of each of these three facilities – and the districts in which they respectively reside. This exclusion serves to *reduce* the APB CVAP statistic to an estimate of the size of this population that is actually eligible to vote. Retaining and including these three large populations would run the risk of artificially inflating the Black CVAP who are eligible to vote in Mississippi in particular. While it is widely recognized that Mississippi has numerous felons ineligible to vote who are not currently incarcerated, there is no practical way to measure or locate these demographically by district in a meaningful way.

47. For the purpose of demographic measurement of prisoners, it is important to note two things. First, the decennial census often reports estimates of "GQ_Corr" or Group Quarters – Correctional populations that are different from the current actual prisoner populations. For the Mississippi State Penitentiary (MSP), for example, the Decennial Census reported 304 prisoners in Census Block 281339501005056 (with 88 WNH and 212 APB), and 2,790 prisoners in adjacent Census Block 281339501005057 (1,179 WNH and 1,416 APB). This totals 3,094, with 1,267 (41%) WNH and 1,628 (52.6%) APB. For the Census Block Group (BG) 281339501005 containing MSP reported by the ACS CVAP file for the DOJ, there are a reported 4,585 CVAP – 3,165 of which are reported as Black CVAP. Neither the 2020 Decennial Census nor the ACS statistics for the Black population here are consistent with official MS DOC reports. At the time of the writing of this paper, Mississippi Department of Corrections (MS DOC) had published prisoner statistics through March of 2022 – and is on these numbers our analysis relies. As shown in *Table III.E.1* (below) MS DOC reported 1,283 Black prisoners, 665 White prisoners and 20 "other" prisoners at MSP. I use the MS DOC numbers in the analysis – removing them from our CVAP in order to estimate an accurate voter-eligible population. MS DOC reported 1,435 Black prisoners and 1,301 White and 43 other prisoners at the Central Mississippi Correctional Facility (CMCF). MS DOC reported 1,476 Black prisoners, 751 White and 29 other prisoners at the South Mississippi Correctional Institution (SMCI). My analysis includes these three facilities but does not include smaller facilities such as county or youthful offender facilities, private prisons or regional correctional facilities both because of their size and the fact the MS DOC does not break out the prisoners in each of those facilities individually.

Table III.E.1 Mississippi Prisoner Analysis by Race and Ethnicity, March 2022 by Facility

LOCATION	Black		White		Hispanic		Native American		Asian		Data Unavailabl		TOTAL
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	
MSP	1,283	0	685	0	11	0	1	0	7	0	1	0	1,988
CMCF	1,098	337	783	538	17	7	8	5	4	2	0	0	2,779
SMCI	1,476	0	751	0	24	0	4	0	1	0	0	0	2,256
[redacted]													
Private Prisons	2,102	0	861	0	20	0	8	0	4	0	1	0	2,996
Regional Correctional Facilities	2,515	40	1,350	55	60	2	6	1	0	0	0	0	4,050
[redacted]													
TOTAL	10,788	527	6,182	929	267	13	33	7	44	3	13	1	18,747
% OF TOTAL OFFENDERS	57.55%	2.81%	32.98%	4.96%	1.10%	.07%	.18%	.04%	.23%	.02%	.07%	.01%	100.00%

Source: Mississippi Department of Corrections https://www.mdoc.ms.gov/Admin-Finance/MonthlyFacts/03-01-2022.1.pdf.

48. The statistics in *Table III.E.1* show there are both large *absolute* numbers of Black prisoners in these facilities, and that there is also a higher *proportionate* number of Black prisoners in the three major prisons in Mississippi than White prisoners overall and by gender. While not all of these prisoners are ineligible to vote, for purposes of this analysis, I assume that they are. I use the MS DOC numbers in my estimates of those eligible to vote by race and ethnicity – removing Black prisoners from APB CVAP in the counties where they are located in order to place a lower boundary on the voter-eligible Black population.

49. *Table III.E.2* (below) shows the CVAP analysis with these prisoners excluded for the existing Supreme Court Districts. In the first row, for District 1, one can see that the CVAP is 705,555. The WNH population is 324,204 and the APB population is 360,356. The percent Black CVAP is shown in the last two columns. The "%APB" column reports the % APB CVAP w*ithout adjustment* for Black prisoners. The "%APB – "Prison Adjusted" column reports the % APB CVAP *with adjustment* for Black prisoners. The numbers shaded in green are higher % Black, and the numbers shaded in red are lower %Black.

50. The % APB CVAP for District 1 (shown in the % APB column) is 51.1%. District 1 in the existing plan contains both MSP and CMCF (combined for 2,718 Black prisoners and 2,029 other prisoners). District 2 contains SMCI (with 1,476 Black prisoners and 780 other prisoners). The % APB CVAP Prison Adjusted for District 1 (shown in the % APB – Prison Adj. column) is 51.0%. That is – under the assumption that all of the prisoners are ineligible to vote, the adjustment for Black prisoners reduces the % Black CVAP eligible to vote by approximately 0.1%. It is clear from this analysis that

regardless of whether you include Black prisoners or not – the APB CVAP in District 1 in the existing plan is currently a "majority minority" population. Further investigation revealed that even if I used the most conservative, restrictive definition of Black (Black Alone, non-Hispanic) of which there are 358,072 in District 1 – one would still find a majority of 50.8%.

Table III.E.2 2020 Census Voting Age Population for Existing SCOMS Districts

Existing Districts	CVAP	WNH	APB	Black Prisoners	Other Prisoners	% APB	%APB - Prison Adj.
1	705,555	324,204	360,256	2,718	2,029	51.1%	51.0%
2	781,300	527,524	218,180	1,476	780	27.9%	27.8%
3	751,245	479,855	250,322			33.3%	33.3%
Grand Total	**2,238,100**	**1,331,583**	**828,758**	**4,194**	**2,809**	37.0%	37.0%

Source: Calculations for author by Bryan GeoDemographics using 2016-2020 ACS DOJ CVAP and MS DOC Reported Prisoner Populations.

51. *Table III.E.3* (below) shows the % APB CVAP under Cooper's Illustrative Plan 1. The % APB CVAP for District 1 (shown in the % APB column) is an *overwhelming* majority of 57.1%. District 1 in this plan contains MSP (with 1,283 Black prisoners and 685 other prisoners). District 2 contains SMCI and CMCF (with 2,911 Black prisoners and 2,124 other prisoners). The % APB CVAP Prison Adjusted for District 1 (shown in the "% APB – Prison Adj." column) is 57.0%. That is, the adjustment for prisoners reduces the % Black CVAP eligible to vote by approximately 0.1%. In this table, it is also interesting to note that the D1 APB population of 414,130 is exactly half of the total APB population of 828,758.

Table III.E.3 2020 Census Voting Age Population for Cooper Illustrative Plan 1 Districts

Illustrative 1	CVAP	WNH	APB	Black Prisoners	Other Prisoners	% APB	%APB - Prison Adj.
1	725,645	295,443	414,130	1,283	685	57.1%	57.0%
2	740,350	529,260	175,711	2,911	2,124	[illegible]	[illegible]
3	772,105	506,880	238,917			30.9%	30.9%
Grand Total	**2,238,100**	**1,331,583**	**828,758**	**4,194**	**2,809**	37.0%	37.0%

Source: Calculations for author by Bryan Geodemographics using 2016-2020 ACS DOJ CVAP and MS DOC Reported Prisoner Populations.

52. *Table III.E.4* (below) shows the % APB CVAP under Cooper's Illustrative Plan 2. The % APB CVAP for District 1 (shown in the % APB column) is again an *overwhelming* majority of 55.4%. District 1 in this plan contains MSP (with 1,283 Black prisoners and 685 other prisoners). District 2 contains SMCI (with 1,476 Black prisoners and 780 other prisoners). District 3 contains CMCF (with 1,435 Black prisoners and 1,344

other prisoners). The % APB CVAP Prison Adjusted for District 1 (shown in the % APB – Prison Adj. column) is 55.4%. That is – the adjustment for prisoners reduces the % Black CVAP eligible to vote is negligible.

Table III.E.4 2020 Census Voting Age Population for Cooper Illustrative Plan 2 Districts

Illustrative 2	CVAP	WNH	APB	Black Prisoners	Other Prisoners	% APB	%APB - Prison Adj.
1	734,095	308,563	406,542	1,283	685	55.4%	55.4%
2	747,610	513,335	199,460	1,476	780	26.7%	26.6%
3	756,395	509,685	222,756	1,435	1,344	29.4%	29.4%
Grand Total	**2,238,100**	**1,331,583**	**828,758**	**4,194**	**2,809**	37.0%	37.0%

Source: Calculations by Bryan GeoDemographics for author using 2016-2020 ACS DOJ CVAP and MS DOC Reported Prisoner Populations.

53. *Table III.E.5* (below) shows the % APB CVAP under Cooper's Least Change Plan 1. The % APB CVAP for District 1 (shown in the % APB column) is still an *overwhelming* majority of 54.4%. District 1 in this plan contains both MSP and CMCF (combined for 2,718 Black prisoners and 2,029 other prisoners). District 2 contains SMCI (with 1,476 Black prisoners and 780 other prisoners). The % APB CVAP Prison Adjusted for District 1 (shown in the % APB – Prison Adj. column) is 54.4%. That is – the adjustment for prisoners reduces the % Black CVAP eligible to vote is negligible.

Table III.E.5 2020 Census Voting Age Population for Cooper Least Change Plan 1 Districts

Least Change 1	CVAP	WNH	APB	Black Prisoners	Other Prisoners	% APB	%APB - Prison Adj.
1	718,485	305,683	390,711	2,718	2,029	54.4%	54.4%
2	751,875	516,885	201,241	1,476	780	26.8%	26.6%
3	767,740	509,015	236,806			30.8%	30.8%
Grand Total	**2,238,100**	**1,331,583**	**828,758**	**4,194**	**2,809**	37.0%	37.0%

Source: Calculations by Bryan GeoDemographics for author using 2016-2020 ACS DOJ CVAP and MS DOC Reported Prisoner Populations.

54. *Table III.E.6* (below) shows the % APB CVAP under Cooper's Least Change Plan 2. The % APB CVAP for District 1 (shown in the % APB column) is still a majority of 53.8%. District 1 in this plan contains both MSP and CMCF (combined for 2,718 Black prisoners and 2,029 other prisoners). District 2 contains SMCI (with 1,476 Black prisoners and 780 other prisoners). The % APB CVAP Prison Adjusted for District 1 (shown in the % APB – Prison Adj. column) is 53.8%. That is – the adjustment for prisoners reduces the % Black CVAP eligible to vote is negligible.

Table III.E.6 2020 Census Voting Age Population for Cooper Least Change Plan 2 Districts

Least Change 2	CVAP	WNH	APB	Black Prisoners	Other Prisoners	% APB	%APB - Prison Adj.
1	728,555	318,494	392,118	2,718	2,029	53.8%	53.8%
2	781,300	527,524	218,180	1,476	780	27.9%	27.8%
3	728,245	485,565	218,460			30.0%	30.0%
Grand Total	**2,238,100**	**1,331,583**	**828,758**	**4,194**	**2,809**	37.0%	37.0%

Source: Calculations by Bryan GeoDemographics for author using 2016-2020 AVS DOJ CVAP and MS DOC Reported Prisoner Populations.

55. *Table III.E.7* (below) shows the percent APB CVAP over time as estimated from the American Community Survey over three segments of time. First from the 2014-2018 5-year ACS DOJ dataset, then from the 2015-2019 5-year ACS DOJ dataset, then from the most recent 2016-2020 5-year ACS DOJ dataset. One can see in the first row of this table that the %APB CVAP population in the current plan was already a majority in the 2014-2018 dataset – and has since grown to 51% in the most recent 2016-2020 ACS DOJ dataset. As expected, in each of Cooper's alternative plans - the %APB CVAP population in the current plan were all already significant majorities in the 2014-2018 ACS DOJ dataset – and has since grown even more significant majorities in the most recent 2016-2020 ACS DOJ dataset. Under each of Cooper's alternative plans, the %APB CVAP grows from an existing majority to a larger majority.

Table III.E.7 CVAP analysis over time: District 1 % APB CVAP under Current Plan compared to Cooper's Plans for 2014-2018, 2015-2019 and 2016-2020

	2014-2018	2015-2019	2016-2020
Current Plan	50.8%	51.0%	51.0%
Illustrative 1	56.8%	57.1%	57.0%
Illustrative 2	54.9%	55.3%	55.4%
Least Change 1	54.1%	54.4%	54.4%
Least Change 2	53.4%	53.7%	53.8%

Source: ACS, as described and discussed in the text; calculations by BryanGeoDemographics for author.

F. Performance of Mississippi Districts Using Traditional Redistricting Principles

56. The state of Mississippi does not have legally required periodic updates to their Supreme Court Districts. As such, Mississippi does not have laws or rules to direct how its Supreme Court districts should be drawn other than what is found in Sec 9-3-1 of the State Code. If plans are put forward to re-draw the SCOMS districts, however, it would be appropriate to follow traditional redistricting principles in general as well as redistricting laws found in Mississippi in evaluating them, as was the situation in the "Magnolia Bar" case (Barbour, 1992).

57. Different states consider and implement different criteria. For example, in some states, including Texas, state constitutions *require* the use of counties to draw certain legislative boundaries, while others just require them to be considered. The Congressional Research Service explains:

> "Many of the 'rules' or criteria for drawing congressional boundaries are meant to enhance fairness and minimize the impact of gerrymandering. These rules, standards, or criteria include assuring population equality among districts within the same state; protecting racial and language minorities from vote dilution while at the same time not promoting racial segregation; promoting geographic compactness and contiguity when drawing districts; minimizing the number of split political subdivisions and 'communities of interest' within congressional districts; and preserving historical stability in the cores of previous congressional districts."[20]

Following the general path found in Cooper's report, I continue under the assumption that these same principles apply to redistricting of the state's Supreme Court districts.

58. The National Conference of State Legislatures (NCSL) is widely recognized as the nation's independent, objective, and bipartisan authority on redistricting matters.[21] The NCSL has published a series of principles that reflect traditional districting principles (or criteria) have been both informed by and adopted by many states. This guidance

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[20] https://crsreports.congress.gov/product/pdf/R/R42831/3

[21] https://www.ncsl.org/aboutus/ncslservice/facts-about-ncsl.aspx:

- NCSL is the only organization that advocates solely for states' interests in Washington, D.C.
- NCSL is the only organization that provides support services to legislators and legislative staff.
- NCSL is the only bipartisan organization of its kind with leadership and participation from both sides of the aisle.
- NCSL presents all sides of the issues and provides information based on facts, not politics.
- NCSL promotes the legislative institution as a whole and works to make it stronger and more efficient.
- NCSL's legislator members vote on policy issues that direct the organization's activities on Capitol Hill.
- NCSL's annual Legislative Summit is the largest and most important gathering of the year for legislators and legislative staff.

from the NCSL is the basis of any assessment I make as an expert of individual states or organization's criteria and redistricting plans.

59. These traditional districting principles (or criteria) have been adopted by many states:

- **Compactness:** Having the minimum distance between all the parts of a constituency (a circle, square or a hexagon is the most compact district).
- **Contiguity:** All parts of a district being connected at some point with the rest of the district.
- **Preservation of counties and other political subdivisions:** This refers to not crossing county, city, or town, boundaries when drawing districts.
- **Preservation of communities of interest:** Geographical areas, such as neighborhoods of a city or regions of a state, where the residents have common political interests that do not necessarily coincide with the boundaries of a political subdivision, such as a city or county.
- **Preservation of cores of prior districts:** This refers to maintaining districts as previously drawn, to the extent possible. This leads to continuity of representation.
- **Avoiding pairing incumbents**: This refers to avoiding districts that would create contests between incumbents.

60. Mississippi specifically has codified many of these principles into law for redistricting their legislature and congressional districts. For legislative districts, Mississippi requires districts to be compact, contiguous and to preserve political subdivisions.[22] Mississippi Code § 5-3-101 states:

> In accomplishing the apportionment, the committee shall follow such constitutional standards as may apply at the time of the apportionment and shall observe the following guidelines unless such guidelines are inconsistent with constitutional standards at the time of the apportionment, in which event the constitutional standards shall control:
>
> (a) Every district shall be compact and composed of contiguous territory and the boundary shall cross governmental or political boundaries the least number of times possible; and
>
> (b) Districts shall be structured, as far as possible and within constitutional standards, along county lines; if county lines are fractured, then election district lines shall be followed as nearly as possible.[23]

[22] https://www.ncsl.org/research/redistricting/redistricting-criteria.aspx

[23] https://law.justia.com/codes/mississippi/2016/title-5/chapter-3/standing-joint-legislative-committee-on-reapportionment/section-5-3-101

For congressional districts, Mississippi requires districts to be to be compact, contiguous, to preserve political subdivisions and to preserve communities of interest.[24]

61. For the purpose of drawing alternate SCOMS districts, plaintiffs' expert Mr. William Cooper has applied the law and principles selectively. He has followed the precedent of SCOMS districting and legislative law using entire counties as the building blocks for SCOMS districts (see Mississippi Code § 5-3-101 part (b), "Districts shall be structured, as far as possible and within constitutional standards, along county lines."). He also has used Mississippi's established Planning and Development Districts ("PDDs" as shown in Appendix 4 Map C) as communities of interest to organize and report demographic features of the state (but does not use these in a meaningful way to actually inform the design of his districts).[25] In fact, Mr. Cooper does *not* even attempt to analyze the SCOMS districts using the traditional redistricting principles of core retention and compactness. I, however, analyze the existing districts and each of his proposed four plans using these principles.

Core Retention

62. Courts have recognized the need to preserve the core of a prior established district as a legitimate redistricting criterion,[26] as well as the avoidance of contests between incumbents.[27] Core retention fosters the continuity of political representation. A *Core Retention Analysis* (CRA) also known as a constituency report is simply a demographic accounting of the addition and subtraction of persons that would be brought about by a proposed realignment of a district's existing boundaries, a process consistent with determining core retention (see paragraph 15). A CRA is a way of quantifying precisely how a proposed realignment would affect the continuity of representation among a district's current residents and eligible voters.

63. Core Retention Analysis has usually considered only the total populations of districts in comparisons across plans. Here, I have also broadened this standard demographic model, using standard methodology to present comparisons to alternative redistricting plans, and by also analyzing the core retention of protected group. I refer to this as "differential" CRA. The "differential" being the findings it generates by district between the total population and the Black population. In the matters of voting rights and redistricting – another population besides total can and does frequently yield

[24] https://www.ncsl.org/research/redistricting/redistricting-criteria.aspx

[25] See Cooper expert report at P.10.

[26] *Abrams v. Johnson*, 521 U.S. 74, 84 (1997).

[27] *Bush v. Vera*, 517 U.S. 952 (1996).

significant differences in CRA findings: race and ethnicity. While race cannot be the prevailing factor in drawing a district - in the state of Mississippi and beyond the impact of redistricting on race and ethnic groups is still of significant legal concern. Are there differential impacts to the total population and by race and ethnicity?

64. In each of the following tables, I show the population from each of the original SCOMS districts distributed into each of Cooper's alternative plan districts. In each column, I show the total population impact, the White, non-Hispanic (WNH) impact, and the any part Black (APB) impact. Below the table, I show core retention diagnostics for District 1 (D1) and then the plan as a whole.

DISTRICT 1 (D1) Core Retention Metrics

- The first row (Existing D1 VAP) shows the VAP in D1 of the existing SCOMS plan.
- The second row (Pop Retained in D1) shows the size of the population that was unperturbed by the new plan. As I move forward, this is the population that I will refer to as "retained".
- The third row (Pop Sent Out of D1) is the size of the population that was originally in D1 but was moved to either D2 or D3.
- The fourth row (Pop Added to D1) is the size of the population that was originally in D2 or D3 but was moved in to D1.
- The fifth row (Net Change to D1) is the net of the population sent out of and added to D1. This is the change in population that drives the change in population behind Mr. Cooper's new alternate district estimates.
- The sixth row (D1 core retention) is the percent of the population from the original D1 plan who are retained in the new plan's D1.

Total Plan Core Retention Metrics

- The seventh row (Pop Retained in Original Districts) is the sum of the population left unperturbed in all 3 districts by the new plan.
- The eighth row (Pop Changing Districts) is the sum of the population moved in all 3 districts by the new plan.
- The ninth row (Plan Core Retention) is the percent of the population from the original plan who are retained in the same district under the new plan.
- In *Table III.F.1* (below) one can see the core retention results for Cooper's Illustrative Plan 1. In District 1 (D1), 63.1% of the total population is retained in District 1, but

the drivers of this differ significantly by race and ethnicity. Only *half* (49.7%) of the WNH population from D1 is retained, while 76.9% of the APB population is retained. Across the entire plan, 74.3% of Mississippi's total population is retained in their original district. 75.2% of WNH and 72.0% of APB are retained in their original districts. 585,817 Mississippians, 325,945 WNH and 230,591 APB are moved. While there is no established threshold for core retention, I argue a move of 25.7% of the population (585,817) to a different judiciary in order to change the APB population in D1 by 54,908 is substantial.

Table III.F.1 Core Retention of Illustrative Plan 1

Row	Original SCOMS	Ill Plan 1	2020 VAP	2020 WNH VAP	2020 APB VAP
A	⊖1	1	452,017	161,498	271,547
B		2	120,310	87,901	24,869
C		3	144,075	75,509	56,675
D	1 Total		716,402	324,908	353,091
E	⊖2	1	123,748	65,155	54,562
F		2	637,259	429,861	153,255
G		3	35,760	22,369	12,595
H	2 Total		796,767	517,385	220,412
I	⊖3	1	161,924	75,011	81,890
J		3	602,506	398,147	167,687
K	3 Total		764,430	473,158	249,577
L	Grand Total		2,277,599	1,315,451	823,080

Existing D1 VAP (D)	716,402	324,908	353,091
Pop Retained in D1 (A):	452,017	161,498	271,547
Pop Sent Out of D1 (B + C):	264,385	163,410	81,544
Pop Added to D1 (E + I):	285,672	140,166	136,452
Net Change to D1 (sent out + added):	21,287	-23,244	54,908
New D1 VAP:	737,689	301,664	407,999
D1 Core Retention:	63.1%	49.7%	76.9%
Pop Retained in Original Districts (A + F + J)	1,691,782	989,506	592,489
Pop Changing Districts (B + C + E + G + I):	585,817	325,945	230,591
Plan Core Retention (Pop Retained / Total Pop):	74.3%	75.2%	72.0%

Source: data discussed in text; calculations by Bryan GeoDemographics for author.

65. In *Table III.F.2* (below) one can see the core retention results for Cooper's Illustrative Plan 2. The results are even more significant than in Illustrative Plan 1. In D1, 51.5% of the total population is retained in D1, but the drivers of this again differ significantly by race and ethnicity. *One-thirds* (35.1%) of the WNH population from D1 is retained, while only 68.6% of the APB population is retained. Across the entire plan, 66.8% of Mississippi's total population is retained in their original district. 67.5% of WNH and 65.7% of APB are retained in their original districts. In this plan, 755,429

Mississippians, 426,938 WNH and 281,962 APB are moved. Again while there is no established threshold for core retention, I argue a move of 33.2% of the population (755,429) to a different judiciary in order to change the APB population in D1 by only 51,349 is substantial.

Table III.F.2 Core Retention of Illustrative Plan 2

Row	Original SCOMS	Ill Plan 2	2020 VAP	2020 WNH VAP	2020 APB VAP
A	1	1	369,056	114,033	242,268
B		2	71,738	39,631	28,703
C		3	275,608	171,244	82,120
D	**1 Total**		**716,402**	**324,908**	**353,091**
E	2	1	77,391	35,211	39,433
F		2	688,622	461,303	172,012
G		3	30,754	20,871	8,967
H	**2 Total**		**796,767**	**517,385**	**220,412**
I	3	1	299,938	159,981	122,739
J		3	464,492	313,177	126,838
K	**3 Total**		**764,430**	**473,158**	**249,577**
L	**Grand Total**		**2,277,599**	**1,315,451**	**823,080**
		Existing D1 VAP (D)	716,402	324,908	353,091
		Pop Retained in D1 (A):	369,056	114,033	242,268
		Pop Sent Out of D1 (B + C):	347,346	210,875	110,823
		Pop Added to D1 (E + I):	377,329	195,192	162,172
		Net Change to D1 (sent out + added):	29,983	-15,683	51,349
		New D1 VAP:	746,385	309,225	404,440
		D1 Core Retention:	51.5%	35.1%	68.6%
		Pop Retained in Original Districts (A + F + J)	1,522,170	888,513	541,118
		Pop Changing Districts (B + C + E + G + I):	755,429	426,938	281,962
		Plan Core Retention (Pop Retained / Total Pop):	66.8%	67.5%	65.7%

Source: data discussed in text; calculations by Bryan GeoDemographics for author

66. In *Table III.F.3* (below) one can see the core retention results for Cooper's Least Change Plan 1. The core retention results here are much better than in Illustrative Plans 1 and 2. In D1, 88.4% of the total population is retained. 85.4% of WNH and 91.7% of APB are retained. Across the entire plan, 92.4% of Mississippi's total population is retained in their original district. 94.3% of WNH and 89.2% of APB are retained in their original districts. In this plan, 172,412 Mississippians, 74,458 WNH and 88,566 APB are moved. I would characterize these changes as minimal and not substantially differentiated by race and ethnicity.

Table III.F.3 Core Retention of Least Change Plan 1

Row	Original SCOMS	LC Plan 1	2020 VAP	2020 WNH VAP	2020 APB VAP
A	1	1	633,441	277,443	323,812
B		3	82,961	47,465	29,279
C	1 Total		716,402	324,908	353,091
D	2	1	30,407	11,431	17,624
E		2	766,360	505,954	202,788
F	2 Total		796,767	517,385	220,412
G	3	1	59,044	15,562	41,663
H		3	705,386	457,596	207,914
I	3 Total		764,430	473,158	249,577
J	Grand Total		2,277,599	1,315,451	823,080
		Existing D1 VAP (C)	716,402	324,908	353,091
		Pop Retained in D1 (A):	633,441	277,443	323,812
		Pop Sent Out of D1 (B):	82,961	47,465	29,279
		Pop Added to D1 (D + G):	89,451	26,993	59,287
		Net Change to D1 (sent out + added):	6,490	-20,472	30,008
		New D1 VAP:	722,892	304,436	383,099
		D1 Core Retention:	88.4%	85.4%	91.7%
		Pop Retained in Original Districts (A + E + H)	2,105,187	1,240,993	734,514
		Pop Changing Districts (B + D + G):	172,412	74,458	88,566
		Plan Core Retention (Pop Retained / Total Pop):	92.4%	94.3%	89.2%

Source: data discussed in text; calculations by Bryan GeoDemographics for author.

67. *Table III.F.4* (below) one can see the core retention results for Cooper's Least Change Plan 2. The core retention results here are again much better than in Illustrative Plans 1 and 2. In D1, 94.8% of the total population is retained. 93.5% of WNH and 97.0% of APB are retained. Across the entire plan, 95.8% of Mississippi's total population is retained in their original district. 97.2% of WNH and 93.6% of APB are retained in their original districts. In this plan, 96,106 Mississippians, 36,540 WNH and 52,420 APB are moved. I would characterize these changes as minimal and not substantially differentiated by race and ethnicity.

Table III.F.4 Core Retention of Least Change Plan 2

Row	Original SCOMS	LC Plan 2	2020 VAP	2020 WNH VAP	2020 APB VAP
A	1	1	679,340	303,930	342,334
B		3	37,062	20,978	10,757
C	**1 Total**		**716,402**	**324,908**	**353,091**
D	2	2	796,767	517,385	220,412
E	**2 Total**		**796,767**	**517,385**	**220,412**
F	3	1	59,044	15,562	41,663
G		3	705,386	457,596	207,914
H	**3 Total**		**764,430**	**473,158**	**249,577**
I	**Grand Total**		**2,277,599**	**1,315,451**	**823,080**
		Existing D1 VAP (C)	716,402	324,908	353,091
		Pop Retained in D1 (A):	679,340	303,930	342,334
		Pop Sent Out of D1 (B):	37,062	20,978	10,757
		Pop Added to D1 (D + G):	59,044	15,562	41,663
		Net Change to D1 (sent out + added):	21,982	-5,416	30,906
		New D1 VAP:	738,384	319,492	383,997
		D1 Core Retention:	94.8%	93.5%	97.0%
		Pop Retained in Original Districts (A + E + H)	2,181,493	1,278,911	770,660
		Pop Changing Districts (B + D + G):	96,106	36,540	52,420
		Plan Core Retention (Pop Retained / Total Pop):	95.8%	97.2%	93.6%

Source: Data discussed in text; calculations by Bryan GeoDemographics for author.

68. In *Table III.F.5* (below) one sees a comparison of the core retention in total and by race, WNH and APB. There are many communities of interest in Mississippi and differential core retention analysis enables one to demographically quantify the impact of potential changes on one of interest, which in this case would be the existing judicial districts. The CRA shows that Illustrative Plans 1 and 2 are significantly disruptive to large numbers of Mississippians across the state in order to achieve small increases in the percent APB in District 1. The differential CRA shows that the Least Change Plans 1 and 2 are minimally disruptive and do *not* displace large numbers of Mississippians. Least Change Plan 1 has a minimal amount of differential core retention by race (that is, 94.3% CRA for WNH and 89.2% CRA for APB is minimally different from 92.4% overall), while Least Change Plan 2 has virtually no differential core retention by race (that is, 97.2% CRA for WNH and 93.6% CRA for APB is minimally different from 95.8% overall).

Table III.F.5 Core Retention Analysis of SCOMS by Plaintiff Plan

Population		III Plan 1	III Plan 2	LC Plan 1	LC Plan 2
Total	District 1	63.1%	51.5%	88.4%	94.8%
	Total	74.3%	66.8%	92.4%	95.8%
WNH	District 1	49.7%	35.1%	85.4%	93.5%
	Total	75.2%	67.5%	94.3%	97.2%
APB	District 1	76.9%	68.6%	91.7%	97.0%
	Total	72.0%	65.7%	89.2%	93.6%

Source: 2020 Census Population analyzed with CRA by SCOMS and alternate plaintiff plans. Calculations by Bryan GeoDemographics for author.

Compactness

69. The second traditional redistricting principle I address is the compactness of districts (See paragraph 15). In addition to noting that compactness was a criteria used in the "Magnolia Bar" case (Barbour, 1992), I once again turn to Mississippi Code § 5-3-101 which states for the purpose of legislative redistricting:

> "In accomplishing the apportionment, the committee shall follow such constitutional standards as may apply at the time of the apportionment and shall observe the following guidelines unless such guidelines are inconsistent with constitutional standards at the time of the apportionment, in which event the constitutional standards shall control."
>
> **(a) Every district shall be compact**

70. Within Mr. Cooper's report on Page 4 (P. 4), Mr. Cooper states that he was "asked by the attorneys for the Plaintiffs in this case [have asked me] to determine whether the Black population in Mississippi is "sufficiently large and **geographically compact**" to allow for one of the three at-large districts for the Mississippi Supreme Court to be drawn with a majority Black voting age population, consistent with traditional districting principles." Mr. Cooper goes on to mention the word "compact" six more times in his report as follows:

1. On P.5, Mr. Cooper states at C. Summary of Expert Conclusions 11. "I have reached the following conclusions: • Based on the 2020 Census, Black Mississippians are sufficiently numerous and **geographically compact** to allow for one majority-Black VAP district".
2. On P.6, Mr. Cooper also states at C. Summary of Expert Conclusions 11 "• In addition, Black Mississippians have been sufficiently numerous and **geographically compact** to allow for one majority-Black VAP district as part of a three-district plan for the Mississippi Supreme Court based on the prior decennial Census numbers from 1990, 2000, and 2010."
3. On P.24, Mr. Cooper states at A. Illustrative Plans and Traditional Redistricting Principles 46. "The two illustrative plans that I have developed contain three districts— each with one

majority-Black district. Both illustrative plans comply with traditional redistricting principles, including **compactness**".

4. On P.24, Mr. Cooper states at A. Illustrative Plans and Traditional Redistricting Principles 47. "The illustrative plans meet the first Gingles precondition, i.e., they demonstrate that the Black population in Mississippi is sufficiently numerous and **geographically compact** to allow for the creation of at least one 3-member majority Black district."

5. On P.24, Mr. Cooper states at A. Illustrative Plans and Traditional Redistricting Principles 48. "There is no question that Mississippi's Black population is "**geographically compact**." For example, and by way of reference, the nine-single member district plan shown in Exhibit G contains three contiguous majority-Black VAP districts (Districts 4, 5, and 6)—demonstrating beyond a shadow of doubt that **the Black population is compactly distributed** north-to-south in and around the Delta."

71. Mr. Cooper makes statements in his report that he is *certain* that the alternate districts as he has configured them are defensibly compact. In fact, on P.24, Mr. Cooper uses language such as "*there is no question*" and "*beyond a shadow of a doubt.*" Yet the only evidence he offers are his own personal observations and strongly stated beliefs. Mr. Cooper does not appear to have gone through the exercise of actually calculating and measuring the compactness of each district in each plan – an exercise that he *has* done in other cases.[28] At this point, I turn my attention to performing and discussing just such an analysis.

72. Compactness is a tool that can be used in redistricting to compare the relative compactness of existing districts against new districts to determine whether the new districts entail minimal or large-scale changes from the existing districts. There are numerous measures of "compactness" – each using different math and concepts. But what compactness measure does an expert use? The law offers few precise definitions of compactness other than "you know it when you see it," which effectively implies a common understanding of the concept. In contrast, academics have shown that compactness has multiple dimensions and have generated many conflicting measures.[29]

73. There is no professional consensus on a "right" measure, and every widely used measure works differently. A district that is "most compact" by one measure can easily

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[28] See Second Declaration of William S. Cooper in Alabama *Caster v. Merrill* and Exhibit 1 - Decl. of William S. Cooper in *Robinson v. Ardoin* and *Galmon v. Ardoin* and related Louisiana redistricting litigation in 2022 both current SCOTUS cases where he reports and discusses CVAP alongside VAP and its importance in measuring minority populations.

[29] "How to Measure Legislative District Compactness If You Only Know it When You See it," https://gking.harvard.edu/presentations/how-measure-legislative-district-compactness-if-you-only-know-it-when-you-see-it-7.

and frequently be less compact by another. Four of the most common measures (Polsby-Popper, Schwartzberg, Reock and Convex Hull) each have unique features[30] so I use each to facilitate a comprehensive analysis of each plan. The analysis includes two tables per plan. The first is the actual scores, by district and by measure including a plan average by measure. The second is a *ranking* by district and by plan. That is – for each district and each measure, how did each score rank (1 being the best score and 5 being the worst)? Last, the tables are thematically shaded based on their performance. Cells in green are the best performing districts, cells in red are poorer performing districts.

Table III.F.6a (below) shows the compactness scores for the existing SCOMS districts, by compactness measure, and *Table III.F.6b* (below) shows the ranks of those scores relative to the other plans. One can compare the average scores and sum these ranks as a means of evaluating the compactness of each plan. For example, using *Table III.F.6b*. For District 1, using the Polsby-Popper Score, the SCOMS plan ranks first, that is, that district, by that measure, out of the five plans (original SCOMS and each of Cooper's alternative plans) is the most compact.

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[30] These measures are provided by the widely used professional redistricting software "Maptitude for Redistricting," for example, the software Mr. Cooper has used in the past in other cases such as in Alabama *Caster v. Merrill*. The Reock compactness score is computed by dividing the area of the voting district by the area of the smallest circle that would completely enclose it. Since the circle encloses the district, its area cannot be less than that of the district, and so the Reock compactness score will always be a number between 0 and 1 (which may be expressed as a percentage). The Area/Convex Hull test computes the ratio the district area to the area of the convex hull of the district (minimum convex polygon which completely contains the district). This measure is always between 0 and 1, with 1 being the most compact. The Polsby-Popper (PP) measure is the ratio of the area of the district to the area of a circle whose circumference is equal to the perimeter of the district. This measure also is always between 0 and 1, with 1 being the most compact. The Schwartzberg test (Schwartzberg, 1966) https://core.ac.uk/download/pdf/217207073.pdf is a perimeter-based measure that compares a simplified version of each district to a circle, which is considered to be the most compact shape possible. Unlike other measures, the scale of Schwartzberg values is *above* 1, with *lower* values approaching 1 being most compact. The Polsby-Popper and Schwartzberg ratios place high importance on district perimeter. Thus, they are highly susceptible to bias due to "shoreline complexity." Therefore, districts that are trimmed around shorelines may end up with a low compactness score through no fault of the district's authors and may not necessarily be a true indicator of gerrymandering. This is precisely why it is important to use multiple compactness scores (in this case the Polsby-Popper, Schwartzberg, Reock and Convex Hull measures) and let the reader judge which one is a better fit based on the geography of the district and method of calculation each score uses. A higher score means more compact, but the scores using different measures cannot be directly compared to each other. *See* Azavea White Paper, "Redrawing the Map on Redistricting," (2012), https://cdn.azavea.com/com.redistrictingthenation/pdfs/Redistricting_The_Nation_Addendum.pdf .

Table III.F.6a Compactness Scores of Existing SCOMS Districts

		More is Better		Less is Better
District	Polsby-Popper	Reock	Convex_Hull	Schwartzberg
1	0.15	0.42	0.65	2.55
2	0.31	0.44	0.77	1.79
3	0.40	0.66	0.88	1.58
Average	0.29	0.51	0.77	1.97

Source: See text. Calculations by Bryan GeoDemographics for author.

Table III.F.6b Compactness Rankings of Existing SCOMS Districts

District	Polsby-Popper	Reock	Convex_Hull	Schwartzberg
1	1	1	3	1
2	3	3	4	3
3	2	1	1	2
Average	2.0	1.7	2.7	2.0

Source: See text. Calculations by Bryan GeoDemographics for author

74. In *Table III.F.6b* one can see that the existing SCOMS districts perform the best or nearly the best for each district, by each measure compared to the other proposed plans. The exception is the Convex Hull measure, which ranks District 1 3rd and District 2 4th out of the five plans. The sum of the ranks for the existing SCOMS plan is 25.

75. *Table III.F.7a* (below) shows the compactness scores for the Cooper Illustrative 1 Plan districts, by compactness measure, and *Table III.F.7b* shows the ranks of those scores relative to the other plans.

Table III.F.7a Compactness Scores of Cooper Illustrative 1 Districts

		More is Better		Less is Better
District	Polsby-Popper	Reock	Convex_Hull	Schwartzberg
1	0.15	0.32	0.74	2.61
2	0.31	0.39	0.80	1.80
3	0.37	0.38	0.79	1.65
Average	0.27	0.36	0.78	2.02

Source: See text. Calculations by Bryan GeoDemographics for author

Table III.F.7b Compactness Ranking of Cooper Illustrative 1 Districts

District	Polsby-Popper	Reock	Convex_Hull	Schwartzberg
1	2	3	1	2
2	5	4	2	4
3	3	4	2	3
Average	3.3	3.7	1.7	3.0

Source: See text. Calculations by Bryan GeoDemographics for author

76. In *Table III.F.7b* one can see that the Cooper Illustrative 1 Plan districts perform more poorly than the existing SCOMS plan. That is, the plan is less compact. The Convex Hull measure ranks District 1 as 1st with District 2 and District 3 tied for 2nd. The sum of the ranks for the Cooper Illustrative 1 Plan is 35.

Table III.F.8a Compactness Scores of Cooper Illustrative 2 Districts

		More is Better		Less is Better
District	Polsby-Popper	Reock	Convex_Hull	Schwartzberg
1	0.12	0.27	0.71	2.85
2	0.38	0.48	0.78	1.62
3	0.29	0.33	0.72	1.85
Average	0.27	0.36	0.74	2.11

Source: See text. Calculations by Bryan GeoDemographics for author

Table III.F.8b Compactness Ranking of Cooper Illustrative Plan 2 Districts

District	Polsby-Popper	Reock	Convex_Hull	Schwartzberg
1	3	5	2	3
2	2	2	3	2
3	5	5	4	5
Average	3.3	4.0	3.0	3.3

Source: See text. Calculations by Bryan GeoDemographics for author

77. In *Table III.F.8b* one can see that the Cooper Illustrative Plan 2 districts performs even more poorly than the existing SCOMS plan. That is, the plan is less compact. The District 2 configuration generally performs well across the different measures. The sum of the ranks for the Cooper Illustrative Plan 2 is 41.

Table III.F.9a Compactness Scores of Cooper Least Change 1 Districts

	More is Better			Less is Better
District	Polsby-Popper	Reock	Convex_Hull	Schwartzberg
1	0.09	0.29	0.55	3.39
2	0.39	0.50	0.83	1.60
3	0.33	0.41	0.79	1.74
Average	0.27	0.40	0.72	2.24

Source: See text. Calculations by Bryan GeoDemographics for author

Table III.F.9b Compactness Ranking of Cooper Least Change 1 Districts

District	Polsby-Popper	Reock	Convex_Hull	Schwartzberg
1	5	4	5	5
2	1	1	1	1
3	4	3	3	4

Source: See text. Calculations by Bryan GeoDemographics for author

78. In *Table III.F.9b* one can see that the Cooper Least Change 1 Plan Districts 1 and 3 perform more poorly and the plan overall performs more poorly than the existing SCOMS plan. That is, the plan is less compact overall. The movement of Madison County from District 1 to District 3 significantly distorts the boundaries of District 1 and impairs the compactness of District 3. The sum of the ranks for the Cooper Least Change Plan 1 is 37.

Table III.F.10a Compactness Scores of Cooper Least Change 2 Districts

	More is Better		Less is Better	
District	Polsby-Popper	Reock	Convex_Hull	Schwartzberg
1	0.12	0.35	0.59	2.95
2	0.31	0.44	0.77	1.79
3	0.46	0.54	0.88	1.48
Average	0.30	0.44	0.75	2.07

Source: See text. Calculations by Bryan GeoDemographics for author.

Table III.F.10b Compactness Ranking of Cooper Least Change 2 Districts

District	Polsby-Popper	Reock	Convex_Hull	Schwartzberg
1	4	2	4	4
2	3	3	4	3
3	1	2	1	1
Average	2.7	2.3	3.0	2.7

Source: See text. Calculations by Bryan GeoDemographics for author

79. In *Table III.F.10b* one can see that the Cooper Least Change Plan 2 Districts 1 performs more poorly and the plan overall performs more poorly than the existing SCOMS plan. That is, the plan is less compact. Note that District 2 in this plan is unchanged from the original SCOMS plan. The sum of the ranks for the Cooper Least Change Plan 2 is 32.

80. In summary, the alternate plans suggested by Cooper range from somewhat less compact to substantially less compact when compared to the existing SCOMS plan.

G. Voting Age Population Polling Place Spatial Analysis

81. There is a long history of Black voter suppression in Mississippi. In recent years, much has been written about the impact of Black voter disenfranchisement, driven both by social and legal forms of suppression.[31] In this report, I attempt to measure two elements of Black voter suppression. The first is *causal* and is what I discuss here. "What are the differences in proximity, the differences in the distance (proximity) of Black voting age population to current polling stations compared to all voting age population – and, in particular, the WNH voting age population. My hypothesis for this question was that if the Black voting age population were being systematically disenfranchised by the state of Mississippi, a symptomatic indicator of that would be seeing fewer of them close to polling places, and more of them a great distance from polling places. The second measure I discuss is *evidentiary* (discussed later in Section IV): Does one sees actual evidence of Black voter suppression at the polls today? That is: does one see a difference in Black voter registration and Black voter turnout, which one would expect as an outcome of Black voter disenfranchisement?

[31] https://www.clarionledger.com/in-depth/news/politics/elections/2022/08/23/mississippi-voter-access-roadblocks-vote-despite-voting-rights-act-1965/10201239002/

https://publicintegrity.org/politics/elections/who-counts/more-than-15-of-black-mississippi-residents-permanently-barred-from-voting/

https://dce.olemiss.edu/um-votes-exploring-the-history-of-voting-suppression-in-ms/

https://www.fastcompany.com/90570476/how-voters-are-casting-their-ballot-in-the-state-thats-made-it-hardest-to-vote-in-2020

82. The Statewide Election Management System (or "SEMS") is the election information management system - for which data is provided by local officials. This system supports a wide variety of responsibilities related to elections and based on information from SEMS and by working with assorted county election officials, reporters at the Mississippi Free Press (*MFP*) produced an inventory of polling places for the November 8, 2020 election.[32] Using that inventory, BryanGeoDemographics performed for me an in-depth spatial analysis of the location of those polling places and their proximity to the voting age population in total and by race and ethnicity. This analysis was conducted for the population as a whole and by race and ethnicity for the entire state of Mississippi. This analysis was then conducted for each individual county. This sub-state analysis allows one to aggregate and assign the proximity of total VAP, WNH VAP and Any Part Black VAP to polling places within each existing district in the current SCOMS configuration, as well in each illustrative and least change configuration proposed by Mr. Cooper in his expert report. While each of Mr. Cooper's illustrative and least change plans increases the percent of the Black population in District 1, I wanted to know if the increases he achieved came at the expense of Black voter proximity to the polls. That is, while he increased the number and proportion of Blacks – did he increase (or decrease) the number of Blacks who happen to have close proximal access to the polls. If Mr. Cooper's plans increased the number and proportion of Blacks, but he moved close-poll proximity Blacks *out of* District 1 and moved distant-poll proximity Blacks *into* District 1, one could argue that the actual impact of such plans would be to increase Black voter disenfranchisement and risk *fewer* Blacks actually turning out to vote.

83. I was not selective and did not discriminately select a vintage of polling locations that I expected would have been any more or less favorable to the outcome I was researching.

[32] https://www.sos.ms.gov/press/op-ed-secretary-watson-election-reform-whats-best-mississippi; https://www.mississippifreepress.org/voting-2022

Table III.G.1 Distance of Population to Polling Places by Race Definition

		VAP (A)	WNH VAP (B)	APB VAP (C)
1/4 Mile		546,405	282,127	235,277
1	Share of Distance		51.6%	43.1%
	Share of Pop		21.4%	28.6%
1/2 Mile		972,324	488,114	427,910
2	Share of Distance		50.2%	44.0%
	Share of Pop		37.1%	52.0%
< Mile		1,488,775	785,200	612,982
3	Share of Distance		52.7%	41.2%
	Share of Pop		59.7%	74.5%
> Mile		788,824	530,251	210,098
4	Share of Distance		67.2%	26.6%
	Share of Pop		40.3%	25.5%
Total		2,277,599	1,315,451	823,080
5	Share		57.8%	36.1%

Source: data discussed in text; calculations by Bryan GeoDemographics for author.

84. *Table III.G.1* shows the VAP (at A), the WNH VAP (at B), and the APB VAP (at C) with the sum of the population who are different distances from a polling place. In the first row (at 1) I show the population who are within a quarter mile of a polling place. This number is shown as both a percent of the population that is within that distance (WNH / VAP and APB / VAP), as well as the share of that population of their share within the state (WNH VAP within ¼ mile / WNH VAP and APB VAP within ¼ mile / APB VAP for example). In the second row (at 2) I show the population within ½ a mile. In the third row (at 3) I show the population within 1 a mile. And in the fourth row (at 4) I show the population more than a mile distant from a polling place. At 5 I show that the 1,315,451 WNH VAP are 57.8% of the total Mississippi VAP (MS VAP), and 823,080 APB VAP are 36.1% of MS VAP.

85. Starting with my analysis at ¼ mile. While WNH VAP make up 57.8% of MS VAP, they only make up 51.6% of VAP within ¼ mile of a polling place. Conversely, while APB VAP make up 36.1% of MS VAP, they make up 43.1% of VAP within ¼ mile of a polling place. While 21.4% of WNH VAP live within ¼ mile of a polling place, 28.6% of APB VAP live within ¼ mile of a polling place. By both measures, WNH VAP are *under*-represented and APB VAP are *over*-represented at our measure of closest distance (1/4 mile) to MS polling places.

86. Starting with my analysis at ½ mile. While WNH VAP make up 57.8% of MS VAP, they only make up 50.2% of VAP within ½ mile of a polling place. Conversely, while APB VAP make up 36.1% of MS VAP, they make up 44.0% of VAP within 1/2 mile of a polling place. While 37.1% of WNH VAP live within ½ mile of a polling place,

52.0% of APB VAP live within ½ mile of a polling place. By both measures, again, WNH VAP are *under*-represented and APB VAP are *over*-represented at our next proximal measure (1/2 mile) to MS polling places.

87. Starting with my analysis at < 1 mile. While WNH VAP make up 57.8% of MS VAP, they only make up 52.7% of VAP within 1 mile of a polling place. Conversely, while APB VAP make up 36.1% of MS VAP, they make up 41.2% of VAP within 1 mile of a polling place. While 59.7% of WNH VAP live within 1 mile of a polling place, 74.5% of APB VAP live within 1 mile of a polling place. By both measures, again, WNH VAP are *under*-represented and APB VAP are *over*-represented at our next proximal measure (1 mile) to MS polling places.

88. Now, looking at VAP more than one mile from a polling place. While the WNH VAP makes up 57.8% of MS VAP, it makes up 67.2% of VAP more than a mile from a polling place. Conversely, while the APB VAP makes up 36.1% of MS VAP, it makes up 26.6% of VAP more than a mile from a polling place. While 40.3% of the WNH VAP live more than a mile from a polling place, only 25.5% of the APB VAP live more than a mile from a polling place. By both measures, the WNH VAP is *over*-represented and the APB VAP is *under*-represented at our measure of greatest distance (> 1 mile) to MS polling places.

89. These results suggest that in terms of proximity distance to a polling place, Black voters have more of an opportunity to vote than White voters in Mississippi.

H. Diversity Evaluation of the Supreme Court Districts

90. In conjunction with the lawsuit that led to this report, the ACLU (2022) states "It's far past time that the Supreme Court districts that Mississippi uses to elect its Supreme Court reflect the diversity of the state's population, rather than diminishing the voice of Black voters." Given this statement and the recognition of the importance of political and socio-economic diversity by Judge William Barbour in the "Magnolia Bar" case, which involved SCOMS districting (Barbour, 1992), it is worthwhile here to evaluate the issue of population diversity in conjunction with this case involving SCOMS districts.

91. The ACLU and Judge Barbour are not the only entities to recognize the importance of diversity in Mississippi. Another entity is the Board of Trustees of the State Institutions of Higher Learning, whose members are appointed by The Governor on the basis of the State's Supreme Court Districts. Among the Board's policies and bylaws, as

amended through September 29th, 2022,[33] one finds Policy 102.06 (p. 14), a statement on diversity:

> "One of the strengths of Mississippi is the diversity of its people. This diversity enriches higher education and contributes to the capacity that our students develop for living in a multicultural and interdependent world. Our system of government, rooted in respect for all people and respect for each individual, is based on understanding. Embracing diversity of thought, cultural background, experience, and identity helps to foster inclusive and intellectually enriched campus communities that maximize opportunities for success among all students and employees."

92. Given this statement, the one by the ACLU, and the opinion by Judge Barbour, I conducted an examination of the diversity of the Supreme Court Districts themselves using a demographic "cluster analysis" which is set of tools and algorithms used to classify different objects into groups in such a way that the similarity between two objects is maximal if they belong to the same group and minimal otherwise (Gallesty, 2020). It is the process of grouping individuals or entities with similar characteristics or similar variables (NCSS, 2022). In the case of the entities of interest here - Mississippi counties - one can then examine how these groups are represented in the existing and proposed district plans. The *Mississippi Health and Hunger Atlas* (Haggard, Cafer, and Green, 2017) provides the data for this process, which allows one to construct groups of counties through its indices of health and well-being (See paragraph 96 for a description of these indices). In turn, these groups can be used to assess diversity based on the indices. For example, if the cluster analysis reveals that all of the state's 82 counties can be formed into "k" groups, and each of these "k" groups had the same percent of its counties within a given district, the district in question would be maximally diverse; if all of the counties within a given Supreme Court District were members of the same group, there would be no population diversity within the district.

93. The authors of the *Mississippi Health and Hunger Atlas* note that health and hunger are correlated with socio-economic status (Haggard, Cafer, and Green, 2017:1), which in turn is correlated with race (Massey, 2007). This correlation comes back full circle to health and well-being, via the correlation of race and socio-economic status with one another and to mortality (McGehee, 1994; Stockwell, Swanson, and Wicks, 1988; Swanson and McGehee, 1996; Swanson and Sanford, 2012; Swanson and Tedrow, 2018; Waldron, 2002). These correlations support the argument that the health and hunger indices also serve as indices of race and socio-economic status.

[33] http://www.mississippi.edu/board/downloads/policiesandbylaws.pdf

94. As can be seen in *Exhibit III.H.1*, there are nine variables used to indicate health need and seven to indicate hunger need. As described in the Atlas, these variables are combined and summarized to create a single "needs" index for each county in Mississippi, as described in paragraph 96. Five health variables are combined and summarized with five hunger variables to create a single "performance" index for each county. These two indices formed the input for the cluster analysis. I performed what is known as a NCSS K-Means procedure (NCSS, 2022), the results of which are shown in Appendix 2.

95. The performance levels are based on quintiles (Haggard, Cafer, and Green, 2017:4), which are arranged from very low to very high: "Counties with a very low ranking are in the lowest 20 percent for need or performance. Being in the lowest 20 percent or first quintile means counties either have low need or low performance, depending on the indicator. Counties with a very high ranking are in the highest 20 percent counties for need or performance. For example, a very high ranking for percent of food insecure individuals means that county is in the highest 20 percent, or fifth quintile. This denotes the highest need group for percentages of food insecure people in that county." The health indices were scored similarly.

Exhibit III.H.1 Health and Hunger Needs Atlas Needs and Performance Variables

Need Indicators	Performance Indicators
Health	**Health**
Teen Pregnancy Rate per 1,000 Live Births	Primary Care Physicians per 100,000
Low Birth Weight per 100 Live Births	Other Primary Care Providers per 100,000
Pre-Term Birth Rate per 100 Live Births	Medicaid Enrollees per Primary Care Provider
Adult Obesity Rate	Population Enrolled in Medicaid
Adult Diabetes Rate	Under 18 Enrolled in Medicaid
Adult Hypertension per 100,000 Deaths	
Uninsured Adults	
Uninsured Under 18	
Avg. Miles to Closest Primary Care Provider	
Hunger	**Hunger**
Food Insecure Individuals	SNAP Enrollment (% Total Population)
Children Food Insecure	SNAP Enrollment (% Eligible)
Food Insecure with Hunger	SNAP Enrollment: Children (% Eligible)
Population Income Eligible for SNAP	Local Sustainability Resilience Index
Children Income Eligible for SNAP	Overall Performance Rank
Food Affordability	
Low Food Access Index	

Source: *Mississippi Health and Hunger Atlas*, 2017 (indicators are shown and discussed in pp 2 to 22).

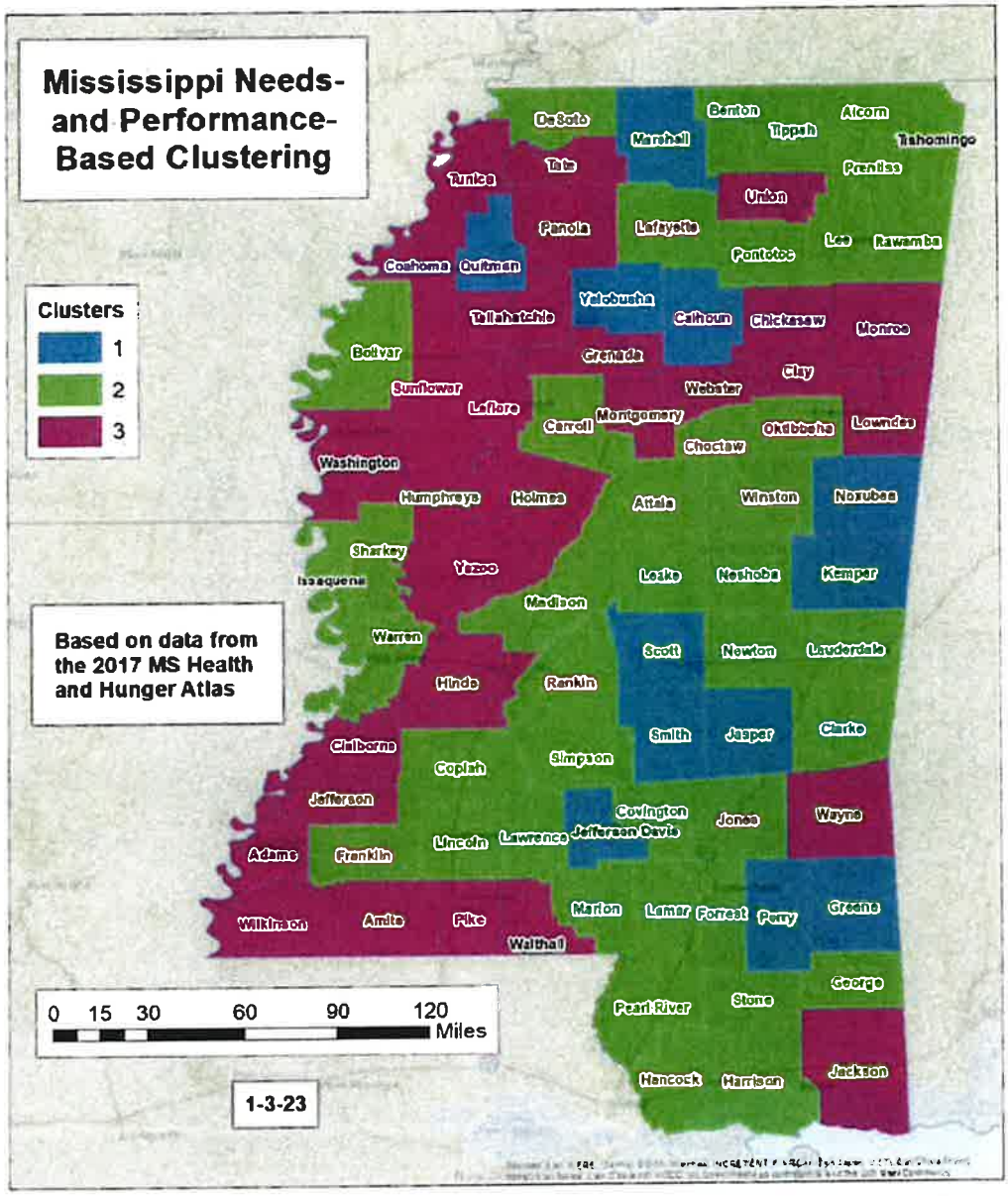
96. The cluster analysis enables us to understand the geographic distribution of population diversity beyond the raw% APB for each county. Using the existing SCOMS districts as a reference (see Appendix 4 Map D), it can be seen that large numbers of high %APB VAP population are generally distributed north and south along the Mississippi river, but there are other concentrations around the state at the county level. District 1 was originally drawn such that it captures much of its APB population along the Mississippi river, but it also extends eastward to capture, among other concentrations, two high APB counties on the eastern edge of Mississippi, Kemper and Noxubee. As will be shown, the current districts each have a given level of population diversity. The cluster analysis enables us to determine if the alternative plans proposed by plaintiffs maintain the level of population diversity found in each of the current districts, increase it, or reduce it.

97. My analysis yielded three clusters as follows: 12 counties in cluster 1 (high need/high performance); 41 counties in cluster 2 (medium need/medium performance); and 29 counties in cluster 3 (high need/low performance). In the remainder of this section, I compare the numbers and types of clusters for the existing SCOMS plans and for each of the plans proposed the Plaintiffs' expert, Mr. Cooper.

98. The overall results can be seen in the map shown as *Exhibit III.H.2*, where 12 counties are clustered into Group 1 (shown in teal), "low need/high performance;" 41 counties are clustered into Group 2 (shown in lime green), "medium "need/medium performance" group; and 29 counties are clustered into Group 3 (shown in purple), "high need/low performance."

99. The counties in each of the three cluster groups would be spread proportionately across the three Supreme Court Districts if diversity was at a maximum. However, unlike group 1, which can be divided by three with no remainder, groups 2 and 3 have fractional remainders. Given this; districts 1, 2 and 3 would have each 4 of the 12 counties in Group 1; districts 1, 2, and 3 would each have 13 of the 41 counties in Group 2, with the remaining two counties placed, respectively, into two of the three districts; and districts 1, 2, and 3 would each have 9 of the 29 counties in Group 3, with the remaining two counties placed, respectively, into two of the three districts. These distributions match the arithmetic means that correspond to the arithmetic means (expressed as percentages) shown in the "b" series of exhibits in this section (see below for a description of the exhibits).

Exhibit III.H.2 Cluster Map Based on Mississippi Needs and Performance Indicators

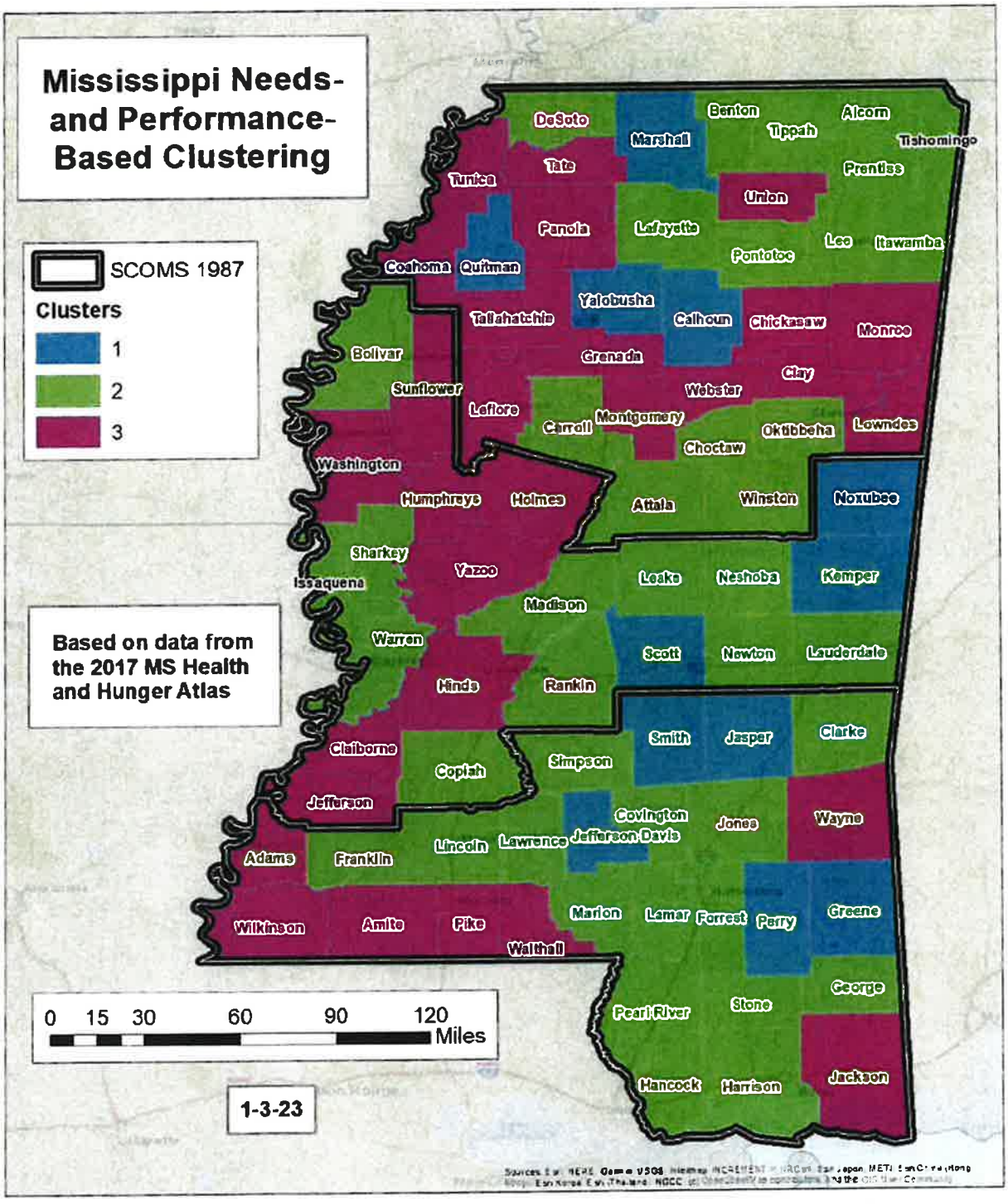


Source: *Mississippi Health and Hunger Atlas*, 2017. K-Means Cluster Analysis & calculations by author; map by Bryan GeoDemographics for author.

100. Next, I present the cluster analysis results for the existing SCOMS districts, and for each of the four alternate plans presented by Mr. Cooper. The remaining series of fifteen exhibits are presented by each of the five plans, with a map, a table and a chart for each, which is in accordance with the following general layout:

- *Exhibit III.H.#.a* is the map showing the arrangement of counties for the plan
- *Exhibit III.H.#.b* is a chart with the statistics of the cluster analysis for the plan
- *Exhibit III.H.#.c* is a chart of the cluster analysis for the plan

Exhibit III.H.3.a Cluster Map for Existing SCOMS Plan



Source: *Mississippi Health and Hunger Atlas*, 2017. K-Means Cluster Analysis & calculations by author; map by Bryan GeoDemographics for author.

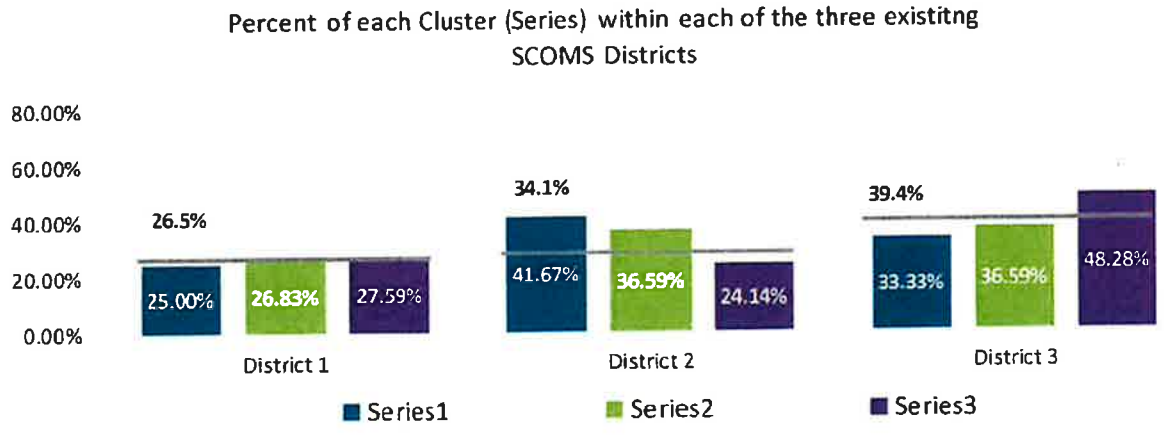
101. *Exhibit III.H.3.a* (above) shows the distribution of counties by cluster group across the three existing Supreme Court Districts. Under the existing plan: District 1 has three of the 12 Group 1 counties (shown in teal), 11 of the 41 Group 2 counties (shown in lime green), and eight of the 29 Group 3 counties (shown in purple); District 2 has five of the 12 Group 1 counties (teal), 15 of the 41 Group 2 counties (lime green) , and seven of the 29 Group 3 counties (purple); District 3 has four of the 12 Group 1 counties (teal), 15 of the 41 Group 2 counties (lime green), and 14 of the 29 Group 3 counties (purple). *Exhibit III.H.3.b* and *Exhibit III.H.3.c* (below) shows the percent of each cluster in tabular and graphical (labeled "Series" in the graph) form with each of the three existing districts.

Exhibit III.H.3.b Cluster Analysis Table: Existing SCOMS Plan

Cluster (Series)	District 1	District 2	District 3	Total
1	25.0%	41.7%	33.3%	100.0%
2	26.8%	36.6%	36.6%	100.0%
3	27.6%	24.1%	48.3%	100.0%
mean	26.5%	34.1%	39.4%	
sd	0.01	0.07	0.06	
cv	0.04	0.22	0.16	

Source: *Mississippi Health and Hunger Atlas*, 2017. K-Means Cluster Analysis, calculation, table and graph by author.

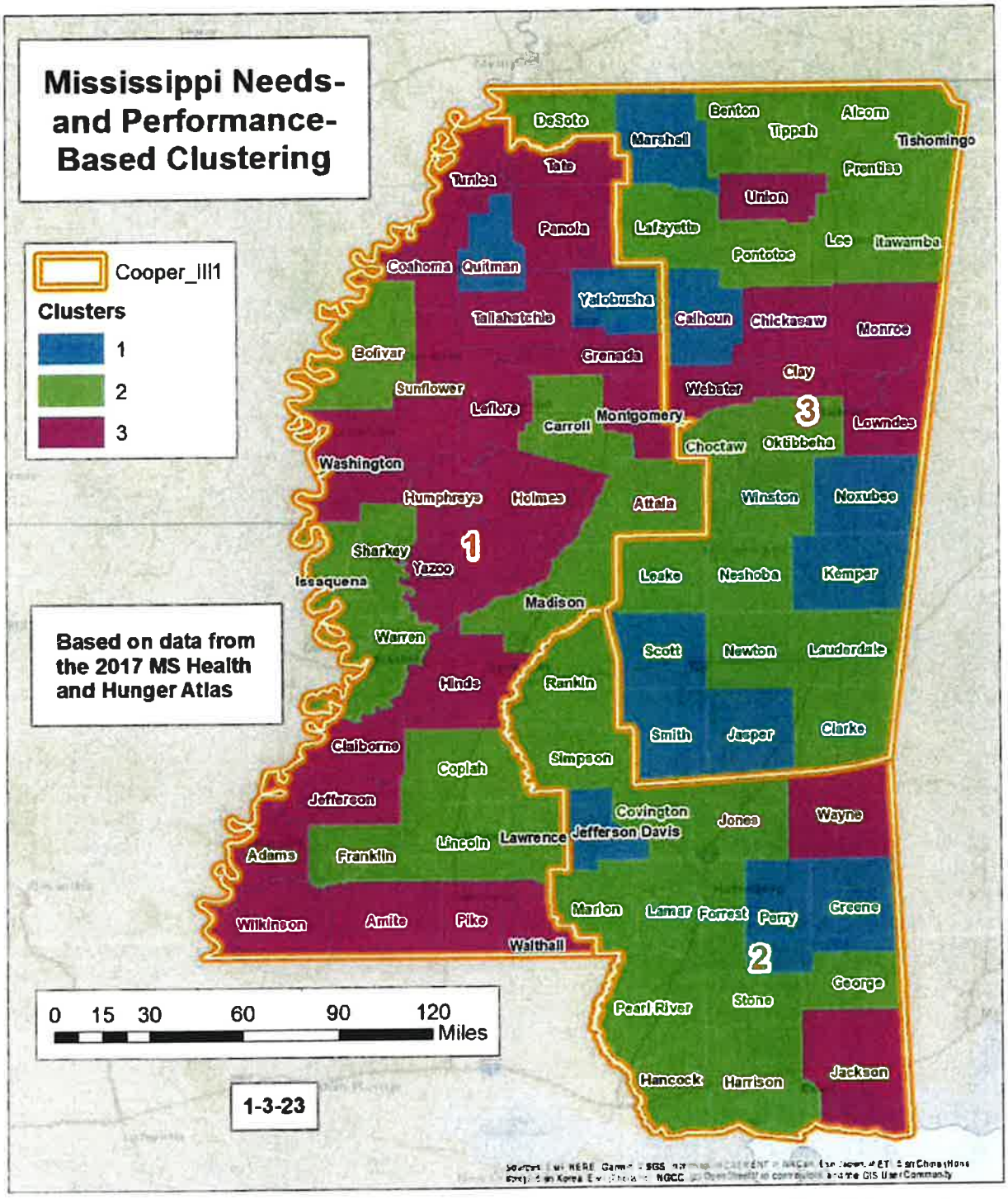
Exhibit III.H.3.c Cluster Analysis Chart: Existing SCOMS Plan



Source: *Mississippi Health and Hunger Atlas*, 2017. K-Means Cluster Analysis, calculation, table and graph by author.

102. In *Exhibit III.H.3.b* and *Exhibit III.H.3.c*, (above) one can see the relative distribution of the cluster groups (labeled as "Series" in the Graph) within each of the three existing Supreme Court Districts numerically and graphically (teal = cluster group 1; lime green = cluster group 2, and Purple = cluster group 3). If all three groups were proportionately distributed equally within each district, the tops of the colored bars would all be at the same height within a given district (which is the arithmetic average of the three groups, as shown approximately by the horizontal bar within each of the three districts). In the case of the Existing Districts, the three groups are nearly distributed equally within existing district 1, Cluster Group 1 (teal bar at 25%), cluster group 2 (lime green at 26.83%) and Cluster group 3 (purple at 27.59%). In existing district 2, the horizontal line shows that cluster groups 1 (teal bar at 41.67%) and 2 (lime green bar at 36.59%) are both higher and closer to one another than either is to group 3 (purple bar at 24.14%), while in existing district 3, groups 1 (teal bar at 33.33%) and 2 (lime green bar at 36.49%) are both lower and closer to one another than either is to group 3 (purple bar at 48.28%). As a way to summarize these results, recall the discussion of the arithmetic mean, standard deviation and coefficient of variation (*CV*) in line item #33, where it is noted that the latter which shows the extent of variation relative to the mean. In District 1, the *CV* is 0.04, in District 2, it is 0.22, and in District 3, it is 0.16. These *CV*s can be interpreted as a measure of the diversity in that the lower they are, the more diversity is equitably distributed. I will compare these *CV* values under the existing set of Supreme Court Districts to those proposed by Cooper, with a focus on District 1.

Exhibit III.H.4.a Cluster Map for Cooper Illustrative Plan 1



Source: *Mississippi Health and Hunger Atlas*, 2017. K-Means Cluster Analysis & calculations by author; map by Bryan GeoDemographics for author.

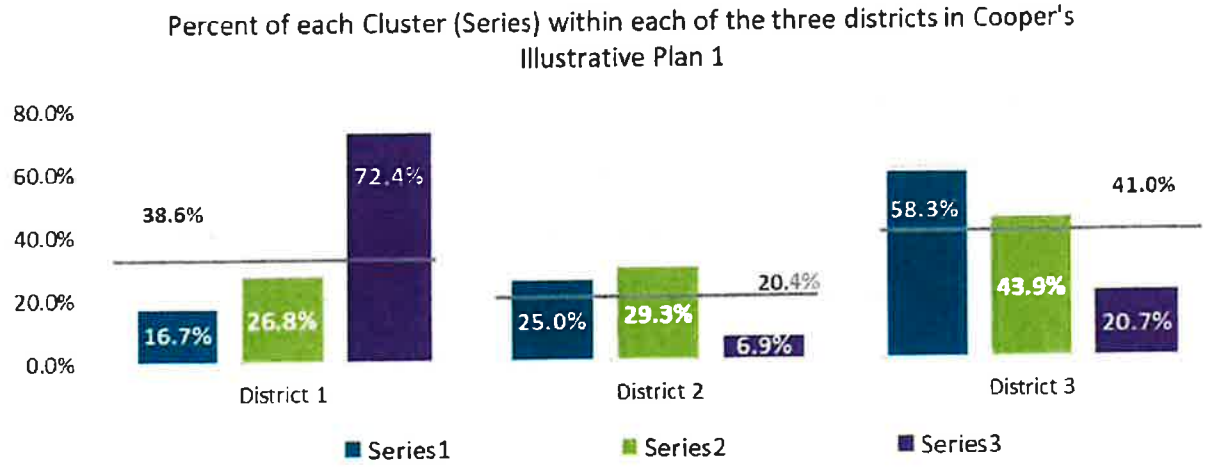
103. *Exhibit III.H.4.a* (above) shows the distribution of counties by cluster group across the three Supreme Court Districts proposed under Cooper's Illustrative Plan I: District 1 has two of the 12 Group 1 counties (shown in teal), 11 of the 41 Group 2 counties (shown in lime green) , and 21 of the 29 Group 3 counties (shown in purple); District 2 has three of the 12 Group 1 counties (teal), 12 of the 41 Group 2 counties (lime green), and two of the 29 Group 3 counties (purple); District 3 has seven of the 12 Group 1 counties (teal), 18 of the 41 Group 2 counties (lime green), and six of the 29 Group 3 counties (purples). *Exhibit III.H.4.b* and *Exhibit III.H.4.c* (below) shows the percent of each cluster in tabular and graphical (labeled "Series" in the graph) form with each of the three districts proposed in Cooper's Illustrative Plan 1.

Exhibit III.H.4.b Cluster Analysis Table: Cooper Illustrative Plan 1

Cluster (Series)	District 1	District 2	District 3	Total
1	16.7%	25.0%	58.3%	100.0%
2	26.8%	29.3%	43.9%	100.0%
3	72.4%	6.9%	20.7%	100.0%
mean	38.6%	20.4%	41.0%	
sd	0.24	0.10	0.16	
cv	0.63	0.48	0.38	

Source: *Mississippi Health and Hunger Atlas*, 2017. K-Means Cluster Analysis, calculations, table and graph by author.

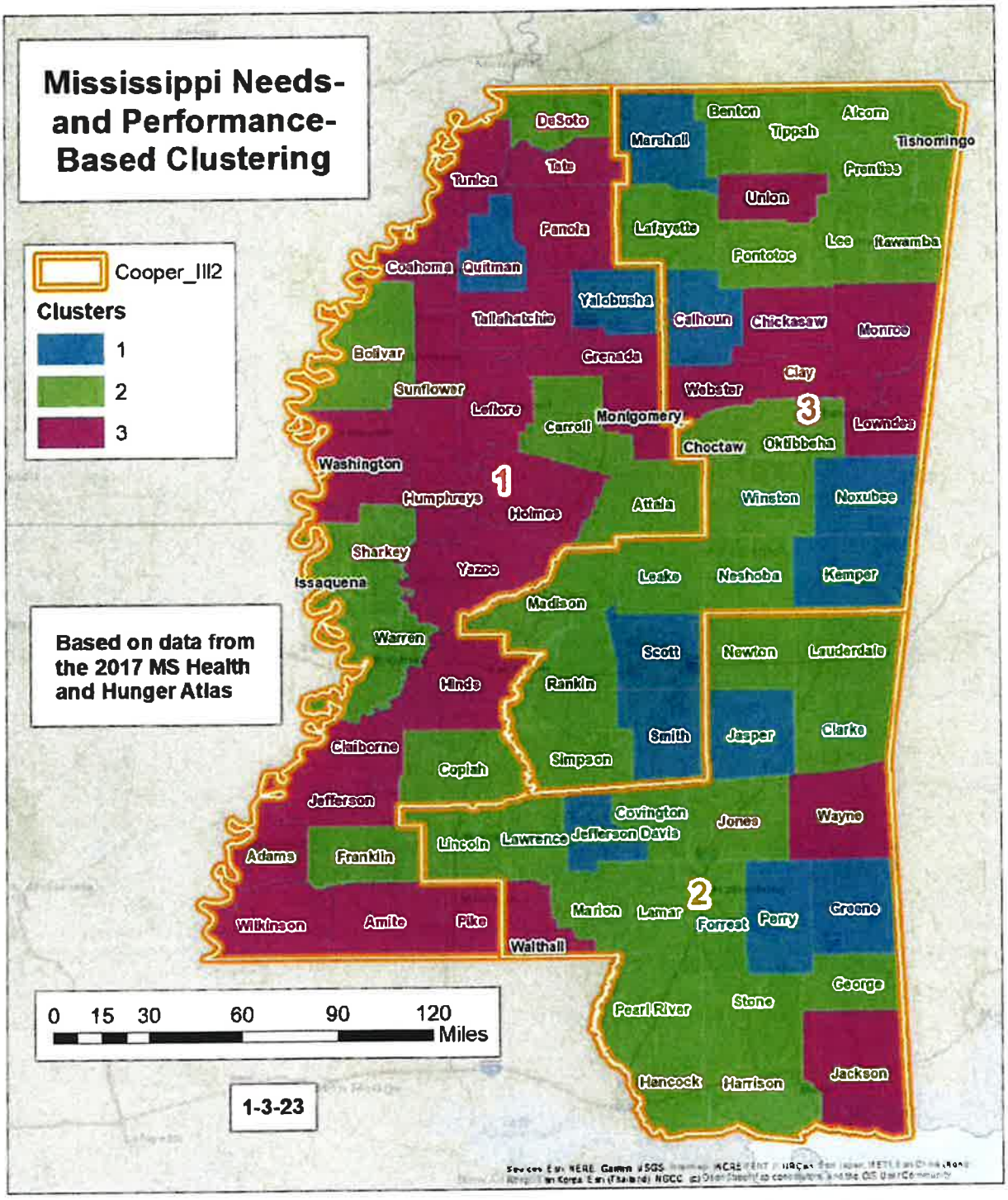
Exhibit III.H.4.c Cluster Analysis Chart: Cooper Illustrative Plan 1



Source: *Mississippi Health and Hunger Atlas*, 2017. K-Means Cluster Analysis, calculations, table and graph by author.

104. In *Exhibit III.H.4.b* and *Exhibit III.H.4.c*, (above) one can see the relative distribution of the cluster groups (labeled as "Series" in the Graph) under Cooper's Illustrative Plan 1, across the three Supreme Court Districts numerically and graphically (teal = cluster group 1; lime green = cluster group 2, and purple = cluster group 3). If all three groups were proportionately distributed equally within each district, the tops of the colored bars would all be at the same height within a given district (which is the arithmetic average of the three groups, as shown by the horizontal bar within each of the three districts). In the case of the districts proposed in Cooper's Illustrative Plan 1, the three groups are highly unequally distributed within District 1, with cluster group 3 (purple bar at 72.4%) counties substantially higher than cluster group 1 (teal bar at 16.7%) and group 2 counties (lime green bar at 26.8%) combined. In proposed District 2, the bars show that cluster groups 1 (teal bar at 25.0%) and 2 (lime green bar at 29.3%) are both substantially higher and closer to one another than either is to group 3 (purple bar at 6.9%), while in Cooper's proposed district 3, groups 1 (teal bar at 58.3%) and 2 (lime green bar at 43.9%) are both substantially higher and closer to one another than either is to group 3 (purple bar at 20.7%). Recall that for the existing districts that the *CV*s, are as follows: In District 1, the *CV* is 0.04; in District 2, it is 0.22; and in District 3, it is 0.16. Under Cooper's Illustrative Plan 1, the *CV*s are 0.63 in District 1, 0.48 in District 2, and 0.38 in District 3, all of which are higher than the corresponding *CV*s found for the existing districts. Notably, the *CV* for District 1 under Cooper's Illustrative Plan 1 is 15.75 times higher than the *CV* for District 1 under the existing plan: It decreases diversity by a factor of 15.75.

Exhibit III.H.5.a Cluster Map for Cooper Illustrative Plan 2



Source: *Mississippi Health and Hunger Atlas*, 2017. K-Means Cluster Analysis & calculations by author; map by Bryan GeoDemographics for author.

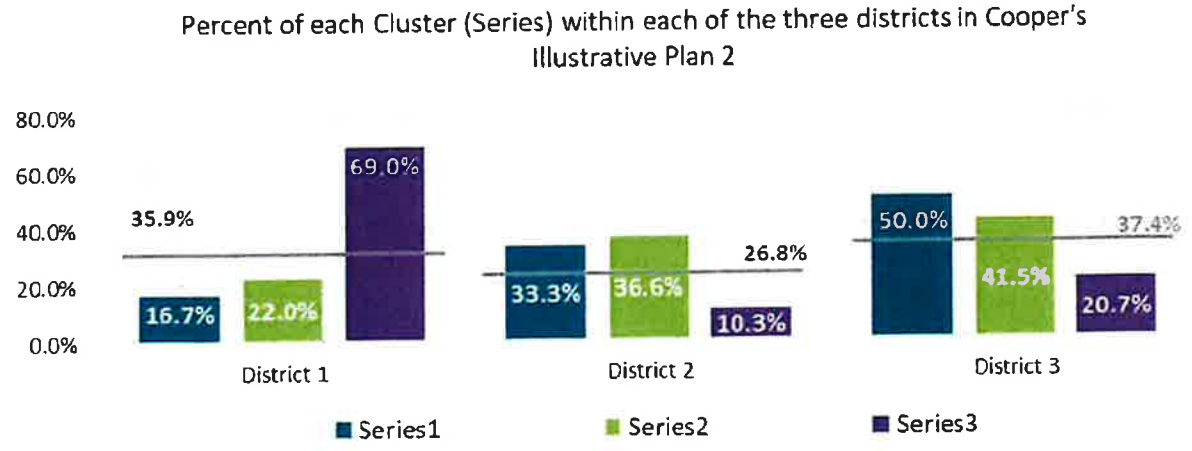
105. *Exhibit III.H.5.a* (above) shows the distribution of counties by cluster group across the three districts proposed under Cooper's Illustrative Plan II. Under this plan: District 1 has two of the 12 Group 1 counties (shown in teal) , nine of the 41 Group 2 counties (shown in lime green), and 20 of the 29 Group 3 counties (shown in lime green); District 2 has four of the 12 Group 1 counties (teal), 15 of the 41 Group 2 counties (lime green), and six of the 29 Group 3 counties (purple); District 3 has six of the 12 Group 1 counties (teal) , 17 of the 41 Group 2 counties (lime green) , and two of the 29 Group 3 counties (purple). *Exhibit III.H.5.b* and *Exhibit III.H.5.c* (below) shows the percent of each cluster in tabular and graphical (labeled "Series" in the graph) form with each of the three districts proposed in Cooper's Illustrative Plan 2.

Exhibit III.H.5.b Cluster Analysis Table: Cooper Illustrative Plan 2

Cluster (Series)	District 1	District 2	District 3	Total
1	16.7%	33.3%	50.0%	100.0%
2	22.0%	36.6%	41.5%	100.0%
3	69.0%	10.3%	20.7%	100.0%
mean	35.9%	26.8%	37.4%	
sd	0.24	0.12	0.12	
cv	0.66	0.44	0.33	

Source: *Mississippi Health and Hunger Atlas*, 2017. K-Means Cluster Analysis, calculations, table and graph by author.

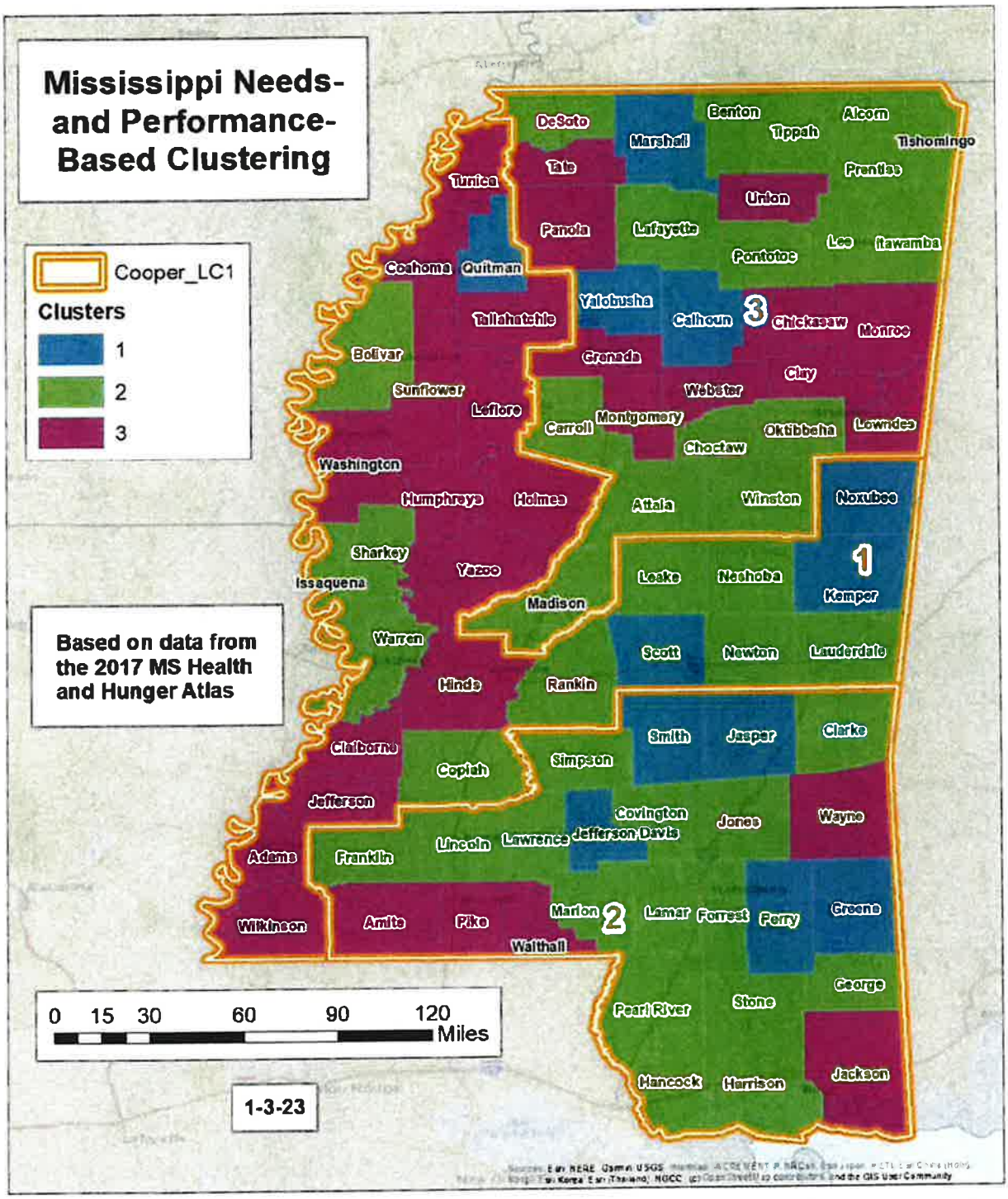
Exhibit III.H.5.c Cluster Analysis Chart: Cooper Illustrative Plan 2



Source: *Mississippi Health and Hunger Atlas*, 2017. K-Means Cluster Analysis, calculations, table and graph by author.

106. In *Exhibit III.H.5.b* and *Exhibit III.H.5.c*, (above), one can see the relative distribution of the cluster groups (Labeled "Series" in the Graph) under Cooper's Illustrative Plan 2, within each of the three Supreme Court Districts numerically and graphically (teal = cluster group 1; lime green = cluster group 2, and purple = cluster group 3). If all three groups were proportionately distributed equally within each district, the tops of the colored bars would all be at the same height within a given district (which is the arithmetic average of the three groups, as approximately shown by the horizontal bar within each of the three districts). In the case of these proposed districts, the three groups are unequally distributed within proposed district 1, with cluster group 3 (purple bar at 69.0%) counties substantially higher than both cluster group 1 (teal bar at 16.7%) and cluster group 2 (lime green bar at 22.0%) counties. In proposed district 2, cluster groups 1 (teal bar at 33.3%) and 2 (lime green bar at 36.6%) are both higher and closer to one another than either is to group 3 (purple bar at 10.3%), while in Cooper's proposed district 3, Cluster group 1 (teal bar at 50%) is higher than group 2 (lime green bar at 41.5%), which, in turn, is substantially higher than cluster group 3 (purple bar at 20.7%). Again, recall that for the existing districts that the *CV*s, are as follows: In District 1, the *CV* is 0.04; in District 2, it is 0.22; and in District 3, it is 0.16. Under Cooper's Illustrative Plan 2, the *CV*s are 0.66 in District 1, 0.44 in District 2, and 0.33 in District 3, all of which are higher than the corresponding *CV*s found for the existing districts. Notably, the *CV* for District 1 under Cooper's Illustrative Plan 1 is 16.5 times higher than the *CV* for District 1 under the existing plan: It decreases diversity by a factor of 16.5.

Exhibit III.H.6.a Cluster Map for Cooper Least Change Plan 1



Source: *Mississippi Health and Hunger Atlas*, 2017. K-Means Cluster Analysis & calculations by author; map by Bryan GeoDemographics for author.

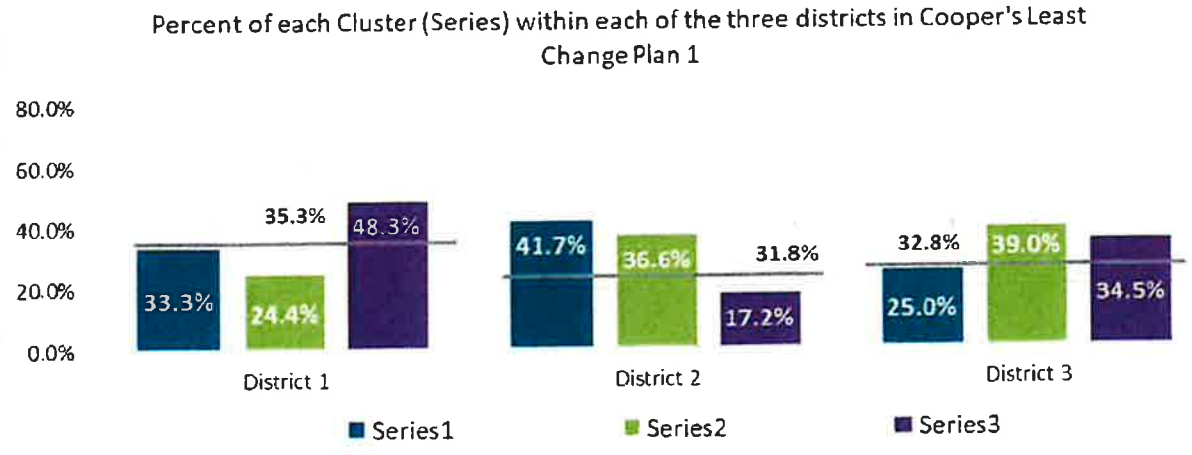
107. *Exhibit III.H.6.a* (above) shows the distribution of counties by cluster group across the three districts proposed under Cooper's Least Change Plan 1. Under this plan: District 1 has four of the 12 Group 1 counties (shown in teal), 10 of the 41 Group 2 counties (shown in lime green), and 14 of the 29 Group 3 counties (shown in purple); District 2 has five of the 12 Group 1 counties (teal), 15 of the 41 Group 2 counties (lime green), and five of the 29 Group 3 counties (purple); District 3 has three of the 12 Group 1 counties (teal), 16 of the 41 Group 2 counties (Lime green), and ten of the 29 Group 3 counties (purple). *Exhibit III.H.6.b* and *Exhibit III.H.6.c* (below) shows the percent of each cluster in tabular and graphical (labeled "Series" in the graph) form with each of the three districts proposed in Cooper's Least Change Plan 1.

Exhibit III.H.6.b Cluster Analysis Table: Cooper Least Change Plan 1

Cluster (Series)	District 1	District 2	District 3	Total
1	33.3%	41.7%	25.0%	100.0%
2	24.4%	36.6%	39.0%	100.0%
3	48.3%	17.2%	34.5%	100.0%
mean	35.3%	31.8%	32.8%	
sd	0.10	0.11	0.06	
cv	0.28	0.33	0.18	

Source: *Mississippi Health and Hunger Atlas*, 2017. K-Means Cluster Analysis, calculations, table and graph by author.

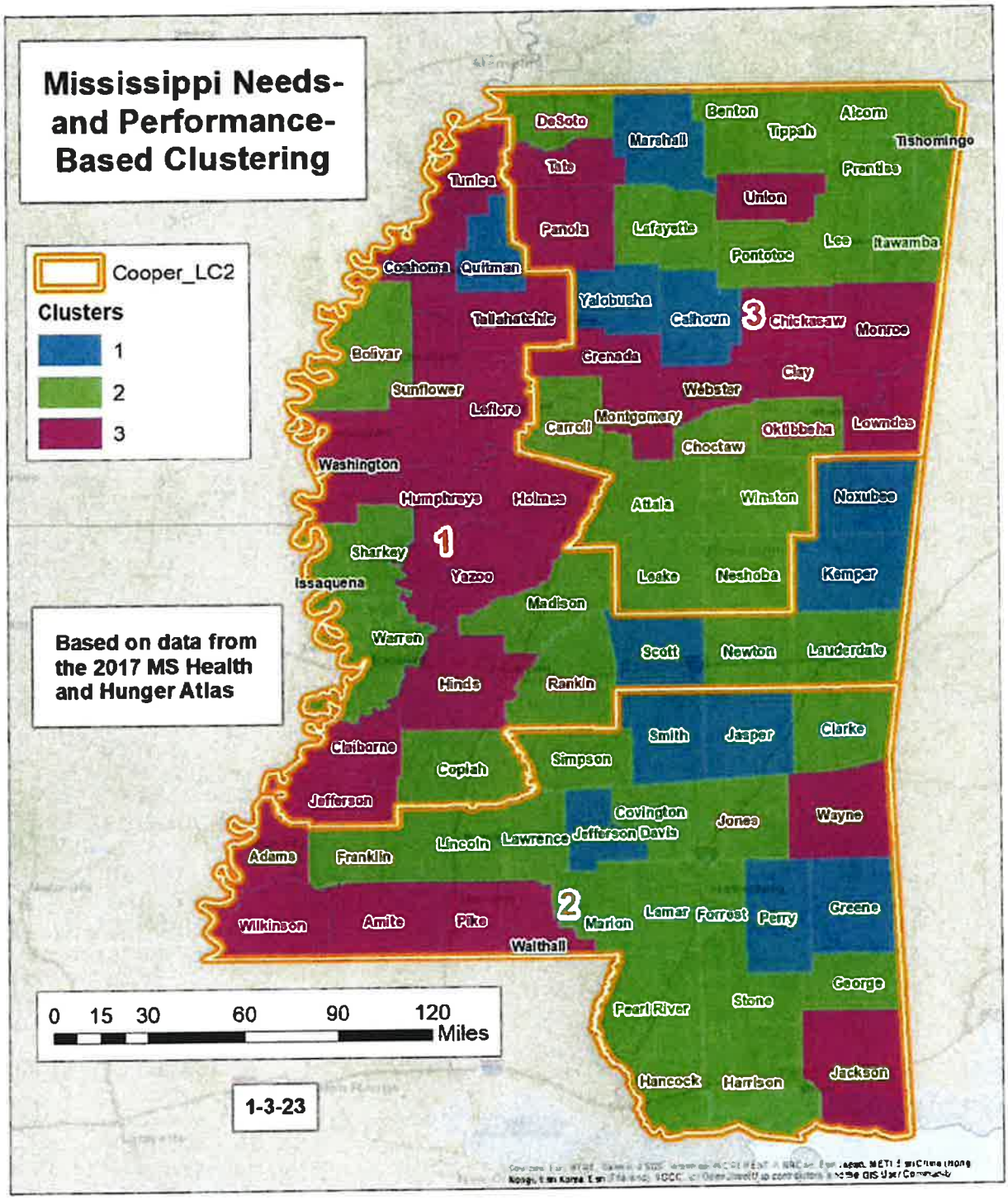
Exhibit III.H.6.c Cluster Analysis Chart: Cooper Least Change Plan 1



Source: *Mississippi Health and Hunger Atlas*, 2017. K-Means Cluster Analysis, calculations, table and graph by author.

108. In *Exhibit III.H.6.b* and *Exhibit III.H.6.c*, (above), one can see the relative distribution of the cluster groups (Labeled "Series" in the Graph) within each of the three Supreme Court Districts proposed in Cooper's Least Change Plan 1 numerically and graphically (teal = cluster group 1; lime green = cluster group 2, and purple = cluster group 3). If all three cluster groups were proportionately distributed equally within each district, the tops of the colored bars would all be at the same height within each of the three districts proposed under Cooper's Least Change Plan I (which is the arithmetic average of the three groups, as shown by the horizontal bar within each of the three districts). The three groups are not distributed equally within Cooper's proposed District 1, where the graph shows that Cluster groups 1 (teal bar at 33.3%) and 2 (lime green bar at 24.4%) are both lower and closer to one another than either is to Cluster group 3 (purple bar at 48.3%). In proposed District 2, Cluster groups 1 (teal bar at 41.6% and 2 (lime green bar at 36.6%) are substantially higher and closer to one another than either is to Group 3 (purple bar at 17.2%). In Cooper's proposed District 3, Cluster group 1 (teal bar at 25%) is lower than that found for Cluster groups 2 (lime green bar at 39.0%) and 3 (purple bar at 34.5%) which are both closer to one another than either is to Cluster Group 1. Once again, recall that for the existing districts that the *CV*s, are as follows: In District 1, the *CV* is 0.04; in District 2, it is 0.22; and in District 3, it is 0.16. Under Cooper's Least Change Plan 1, the *CV*s are 0.28 in District 1, 0.33 in District 2, and 0.18 in District 3, all of which are higher than the corresponding *CV*s found for the existing districts. Notably, the *CV* for District 1 under Cooper's Illustrative Plan 1 is seven times higher than the *CV* for District 1 under the existing plan: It *decreases* diversity by a factor of seven.

Figure III.H.7.a Cluster Map for Cooper Least Change Plan 2



Source: *Mississippi Health and Hunger Atlas*, 2017. K-Means Cluster Analysis & calculations by author; map by Bryan GeoDemographics for author.

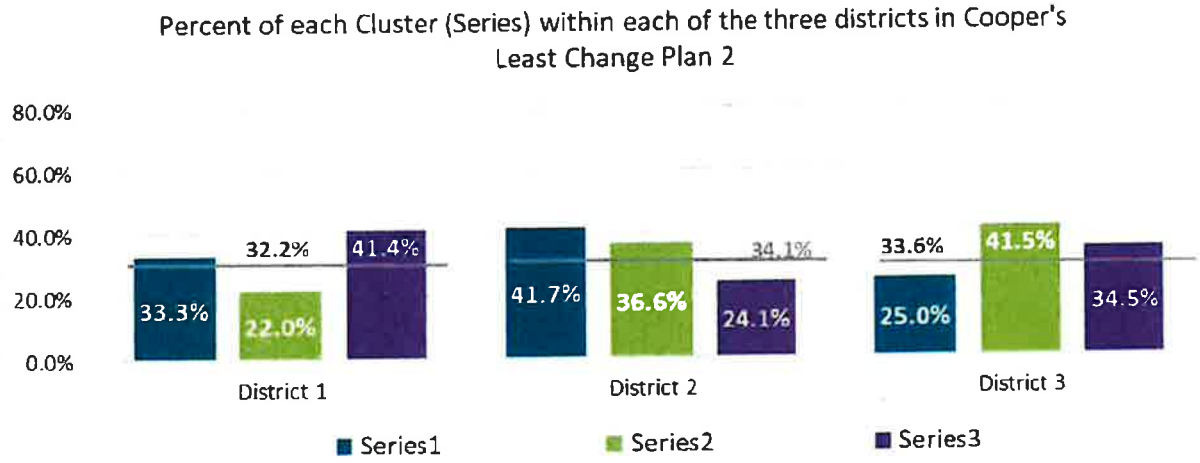
109. *Exhibit III.H.7.a* (above) shows the distribution of counties by cluster group across the three districts proposed under Cooper's Least Change Plan II. Under this plan: District 1 has four of the 12 Group 1 counties (shown in teal), nine of the 41 Group 2 counties (shown in lime green), and 12 of the 29 Group 3 counties (shown in purple); District 2 has five of the 12 Group 1 counties (teal), 15 of the 41 Group 2 counties (lime green), and 10 of the 29 Group 3 counties (purple); District 3 has three of the 12 Group 1 counties (teal), 17 of the 41 Group 2 counties (lime green), and six of the 29 Group 3 counties (purple). *Exhibit III.H.7.b* and *Exhibit III.H.7.c* (below) shows the percent of each cluster in tabular and graphical (labeled "Series" in the graph) form with each of the three districts proposed in Cooper's Least Change Plan 2.

Exhibit III.H.7.b Cluster Analysis Table: Cooper Least Change Plan 2

Cluster (Series)	District 1	District 2	District 3	Total
1	33.3%	41.7%	25.0%	100.0%
2	22.0%	36.6%	41.5%	100.0%
3	41.4%	24.1%	34.5%	100.0%
mean	32.2%	34.1%	33.6%	
sd	0.08	0.07	0.07	
cv	0.25	0.22	0.20	

Source: *Mississippi Health and Hunger Atlas*, 2017. K-Means Cluster Analysis, calculations, table and graph by author.

Exhibit III.H.7.c Cluster Analysis Chart: Cooper Least Change Plan 2



Source: *Mississippi Health and Hunger Atlas*, 2017. K-Means Cluster Analysis, calculations, table and graph by author.

110. In *Exhibit III.H.7.b* and *Exhibit III.H.7.c*, (above), one can see the relative distribution of the cluster groups (Labeled "Series" in the Graph) within each of the three Supreme Court Districts proposed in Cooper's Least Change Plan 2 numerically and graphically (teal = cluster group 1; lime green = cluster group 2, and purple = cluster group 3). If all three cluster groups were proportionately distributed equally within each district, the tops of the colored bars would all be at the same height within each of the three districts proposed under Cooper's Least Change Plan 2 (which is the arithmetic average of the three groups, as shown by the horizontal bar within each of the three districts). The three groups are not distributed equally within Cooper's proposed District 1, where the graph shows that Cluster groups 1 (teal bar at 33.3%) and 2 (lime green bar at 22.0%) are both substantially lower and closer to one another

than either is to Cluster group 3 (purple bar at 41.4%). In proposed District 2, Cluster groups 1 (teal bar at 41.7% and 2 (lime green bar at 36.6%) are both substantially higher and closer to one another than either is to Group 3 (purple bar at 24.1%). In Cooper's proposed District 3, Cluster group 1 (teal bar at 25.0%) is lower than that found for Cluster groups 2 (lime green bar at 41.5%) and 3 (purple bar at 34.5%) which are both closer to one another than either is to Cluster Group 1. Recall, again that for the existing districts that the *CV*s, are as follows: In District 1, the *CV* is 0.04; in District 2, it is 0.22; and in District 3, it is 0.16. Under Cooper's Least Change Plan 2, the *CV*s are 0.25 in District 1, 0.22 in District 2, and 0.20 in District 3, none of which is lower than the corresponding *CV*s found for the existing districts. Notably, the *CV* for District 1 under Cooper's Illustrative Plan 1 is 6.25 times higher than the *CV* for District 1 under the existing plan: It decreases diversity by a factor of 6.25.

111. In summary, each of the four plans proposed by Cooper reduce the level of diversity found in all of the existing three districts and notably do so in regard to District 1.

IV. MISSISSIPPI VOTER REGISTRATION AND TURNOUT

A. Voter Registration and Turnout by Race and Ethnicity in Mississippi

112. A core tenet of the plaintiffs in this case is that Black voters are currently disenfranchised and do not have the same access to voting and do not exercise their right to vote in the same way the Whites in Mississippi do. Here, I examine expert reports written on behalf of the plaintiffs and offer my opinion on current Black voter registration and voting behavior.

113. Measuring voter registration and actual voting in Mississippi by race is a challenge. The state of Mississippi does not record registered voters by race. Given this, the US Census Bureau's Current Population Survey (or "CPS") is used to understand recent voter registration and turnout in Mississippi. Because these data are only available at the whole-state level, I subsequently turn to sample survey data collected by the Survey Research Laboratory, Social Science Research Center, Mississippi State University, to examine sub-state patterns.

114. As part of its regular, on-going Current Population Survey (CPS), the Census Bureau adds periodic supplements asking questions on topics ranging from school enrollment to tobacco use.[34] One such supplement is the "voting and registration" supplement, which is added in November of national voting years.[35] In 2020, the CPS collected information from 134,122 respondents with dozens of detailed questions on voting behavior.[36] The sample is collected for the US as a whole and by state.

115. The US Census Bureau produces two work products from the "voting and registration" supplement. It tabulates and reports the results of the most important questions such as "Did (you/name) vote in the election held on Tuesday, November 3, 2020?" by state and by the most common demographic variables such as age, race, sex and educational attainment. The sample results are then adjusted to estimated population numbers and the results given in 1,000s of persons with 90% margins of error. These tabulations are formal and the resulting reports are viewed as official work products of the Federal Government.[37] When possible, an expert would always start their analysis of registration and voting behavior with a reference to these reports. In addition to these official statistics, the Census Bureau also publishes a "raw data" or "Public Use Microdata Sample" (or "PUMS" file) with data from individual

[34] https://www.census.gov/data/datasets/time-series/demo/cps/cps-supp_cps-repwgt.html

[35] https://www.census.gov/programs-surveys/cps/about/supplemental-surveys.html

[36] https://www2.census.gov/programs-surveys/cps/techdocs/cpsnov20.pdf

[37] https://www.census.gov/data/tables/time-series/demo/voting-and-registration/p20-585.html

respondents, with each weighted to represent the population in the United States they represent. I will discuss the PUMS data in more detail shortly.

116. In the course of examining voter turnout and registration, the first stop was to look at the official tables published by the Census Bureau to see if the statistics desired by race and ethnicity were available for Mississippi. They are in Table 4B, available as an excel file, provides the official statistics on the number and percent registered and voted by race and ethnicity in Mississippi in 2020.[38]

117. *Table IV.A.1* (registration by race and ethnicity) and *Table IV.A.2* (actual voting by race and ethnicity) both present a "Total Population" as well as a "Total Citizen Population" – and show statistics under these categories for several race and ethnicity combinations, such as "White Alone," "Black Alone," "White non-Hispanic," and "Black Alone or in combination". In the online source for these two tables, which is the Census Bureau's Table 4B,[39] it is not clearly stated that the "Total Population" in Table 4B is actually the voting age population ("VAP") and that "Total Citizen Population" is actually the total Citizen Voting Age Population (CVAP). Keep this in mind in reading these two tables and also that the numbers are given in 1,000s.

Table IV.A.1 2020 Mississippi Voter Registration by Race and Ethnicity

Sex, Race, and Hispanic-Origin	Total "VAP" Population	Total citizen population	Total registered	Percent registered (Citizen)	Margin of error 1
Total	**2,212**	**2,177**	**1,749**	**80.4**	**2.7**
Male	1,029	1,015	792	78.0	4.2
Female	1,182	1,162	957	82.4	3.6
White alone	1,350	1,337	1,054	78.8	3.6
White non-Hispanic alone	**1,300**	**1,295**	**1,026**	**79.2**	**3.6**
Black alone	792	787	654	83.1	4.1
Asian alone	37	20	9	B	B
Hispanic (of any race)	67	53	34	B	B
White alone or in combination	1,375	1,363	1,079	79.2	3.5
Black alone or in combination	**805**	**799**	**666**	**83.4**	**4.1**
Asian alone or in combination	41	24	13	B	B

Source: Table 4B, US Census Bureau (https://www2.census.gov/programs-surveys/cps/tables/p20/585/table04b.xlsx). Numbers do not always add to totals due to sampling and rounding error.

[38] https://www2.census.gov/programs-surveys/cps/tables/p20/585/table04b.xlsx

[39] https://www2.census.gov/programs-surveys/cps/tables/p20/585/table04b.xlsx

118. First, I examined voting registration. *Table IV.A.1* row 1 (highlighted in yellow) reading left to right shows the VAP population (2,212), then the total CVAP population (2,177) then the total CVAP registered to vote (1,749), then the percent CVAP who are registered, (80.4%, where 80.4 ≈ (1,749/2,177)*100).[40]

119. *Table IV.A.1* row 5 (highlighted in yellow) shows voter registration results for White non-Hispanic alone population (in 1,000s). Again, reading left to right and starting in the first column, one can see that the White non-Hispanic alone VAP number is 1,300 and that the White non-Hispanic alone CVAP number is 1,295, of which 1,026 were registered to vote, yielding the results that 79.2% of the White non-Hispanic alone CVAP were registered to vote, where 79.2% ≈ (1,026/1,295)*100.

120. *Table IV.A.1* row 10 (highlighted in yellow) shows voter registration results for Black Alone and in combination (in 1,000s). In this row, one sees 799 Black Alone or in combination CVAP, of whom 666 who were registered to vote, yielding the result that 83.4% of the Black Alone or in combination CVAP were registered to vote, where 83.4% ≈ (666/799)*100.

121. Next, I examined actual voting. *Table IV.A.2* shows in the first row, reading from right to left, the VAP population (2,212), then the total CVAP population (2,177) then the CVAP who voted (1,521), then the percent CVAP who voted (70.3%, where 70.3 ≈ (1,521/2,177)*100).

[40] Note the numbers are in the table are the official reported. Percentages may vary slightly due to rounding.

Table IV.A.2 2020 Mississippi Voting by Race and Ethnicity

	Total "VAP" Population	Total citizen population	Total voted	Percent voted (Citizen)	Margin of error 1
Total	**2,212**	**2,177**	**1,531**	**70.3**	**3.2**
Male	1,029	1,015	680	67.0	4.8
Female	1,182	1,162	850	73.2	4.2
White alone	1,350	1,337	921	68.9	4.1
White non-Hispanic alone	**1,300**	**1,295**	**904**	**69.8**	**4.1**
Black alone	792	787	573	72.8	4.9
Asian alone	37	20	B	B	B
Hispanic (of any race)	67	53	23	B	B
White alone or in combination	1,375	1,363	942	69.1	4.0
Black alone or in combination	**805**	**799**	**582**	**72.9**	**4.8**
Asian alone or in combination	41	24	11	B	B

Source: Table 4B, US Census Bureau (https://www2.census.gov/programs-surveys/cps/tables/p20/585/table04b.xlsx). Numbers do not always add to totals due to sampling and rounding error.

Table IV.A.2 row 5 (highlighted in yellow) shows voting results for White non-Hispanic alone population (in 1,000s). Reading right to left and starting in the first column, one can again see that the White non-Hispanic alone VAP number is 1,300 and that the White non-Hispanic alone CVAP number is 1,295, of which 904 voted, yielding the result that 69.8% of the White non-Hispanic CVAP voted, where 69.8% ≈ (904/1,295)*100.

122. *Table IV.A.2* row 10 (highlighted in yellow) shows voting results for Black Alone and in combination (in 1,000s). In this row, one sees 799 Black Alone or in Combination CVAP, of whom 582 voted, yielding the result that 72.9% of the Black Alone or in Combination CVAP voted, where 72.9% ≈ (582/799)*100.

123. In examining the CPS results for the White non-Hispanic and the Black Alone or in combination population in Mississippi for the 2020 election, I am left with a decisive conclusion. In 2020 the Black Alone or in Combination population out-registered and out-voted the White non-Hispanic population. It is clear can see that Black Alone or in Combination were registered at a higher level (83.4%) than the White non-Hispanic (79.2%). And in looking at who voted in the 2020 election, Black Alone or in Combination voted at a higher level (72.9%) than the White non-Hispanic (69.8%).

124. Because the registration and voting data are from a sample survey, there are "Margins of Error" (MOEs) provided with them, which provide an estimate of the statistical uncertainty in the sample-based estimates. In the case of the 2020 CPS data, the MOEs are given at a 95% level of confidence. In regard to the 79.2% of the White

Non-Hispanic CVAP registered to vote, the estimated MOE is 3.6, which is interpreted to mean that one can be 95% certain that the actual percent who registered is between 75.6% and 82.8% (79.2 ± 3.6); similarly, in regard to the 83.4% of the Black Alone or in Combination CVAP registered to vote, the estimated MOE is 4.1, which is interpreted to mean that one can be 95% certain that the actual percent who registered is between 79.3% and 87.5% (83.4 ± 4.1). Because the upper end (82.8%) of the 95% MOE of White Non-Hispanic CVAP percent registered does not overlap the 83.4% estimated in the sample survey of the Black Alone or in combination CVAP registered to vote, one can be 95% certain that the actual percent of Black Alone or in Combination CVAP registered to vote in the 2020 Mississippi election is higher than the actual percent of White non-Hispanic CVAP (Swanson, 2012: 13-157). This finding is supported by the fact that the lower end (79.3%) of the 95% MOE of Black Alone or in Combination CVAP does not overlap the 79.2% of the White non-Hispanic CVAP registered to vote (Swanson, 2012: 153-157).

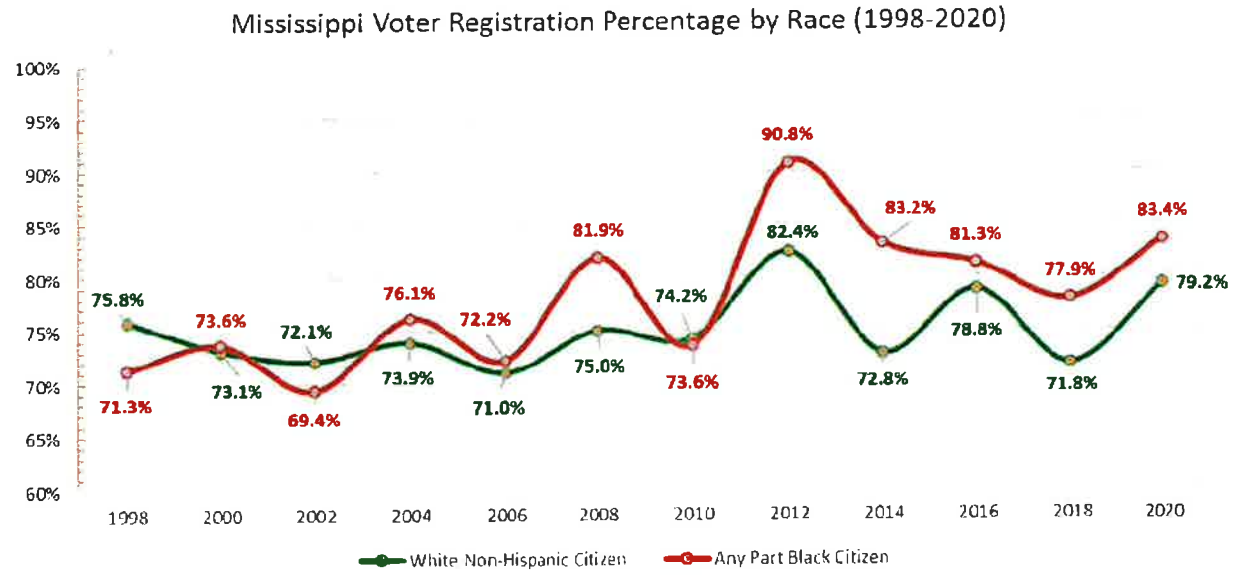
125. In regard to the 69.8% of the White Non-Hispanic CVAP who voted, the estimated MOE is 4.1, which is interpreted to mean that one can be 95% certain that the actual percent who voted is between 65.7% and 73.9% (69.8 ± 4.1); similarly, in regard to the 72.9% of the Black Alone or in Combination CVAP who voted, the estimated MOE is 4.8, which is interpreted to mean that one can be 95% certain that the actual percent who voted is between 68.1% and 77.7% (72.9 ± 4.1). Because the upper end (73.9%) of the 95% MOE of White Non-Hispanic CVAP percent voted overlaps the 72.9% estimated in the sample survey of the Black Alone or in Combination CVAP who voted, one cannot be 95% certain that the actual percent of Black Alone or in combination CVAP who voted in the 2020 Mississippi election is higher than the actual percent of White non-Hispanic CVAP who voted in the 2020 election (Swanson, 2012: 153-157). Using the numbers underlying the 95% level MOEs along with a knowledge of basis inferential statistics, however, one can be 66% certain that the actual percent of Black Alone or in Combination who voted in the 2020 Mississippi election is higher than the actual percent of White non-Hispanic CVAP who did (at a 66% level of confidence, z ≈ 1.00 and with an estimated standard error of .0209, the MOE for this group is 1.21, resulting in the upper 66% MOE bound of 71.0%, where 71.0 = 69.8 +1.21) (Swanson, 2012: 147-150).

126. It is natural to ask if the voter registration and turnout for the 2020 election is an anomaly. In order to investigate this, I examined the historic US Census Bureau's CPS November Supplement the official reports for biannual federal election years. While the Census Bureau has collected voting and registration data since 1964, the CPS has gathered and reported *citizenship* data consistently only since 1998. Since the 2020 data are based on CVAP, I begin my historic analysis in 1998 to ensure data consistency

and comparability with my 2020 analysis to the degree possible (removing noncitizens decreases the voting-age population base, resulting in higher rates for any given election (https://www.census.gov/topics/public-sector/voting/about/faqs.html).

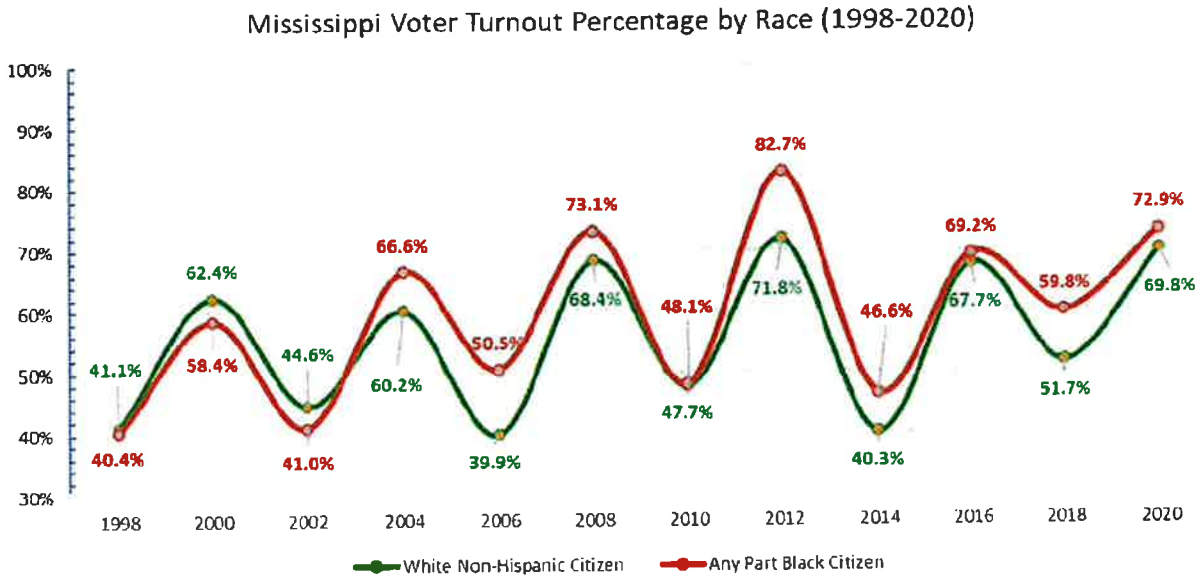
127. In *Exhibit IV.A.1* below, one can see that from each election year from 1998 to 2006, the difference in the percent of registration between White non-Hispanic (WNH) citizens of voting age and any part Black (APB) citizens of voting age was small, being slightly higher or lower based on the election. However, starting in 2008 with Obama's presidential campaign, the percent Black voter registration noticeably exceeded the percent White voter registration. In 2010 (not a presidential election year), the percent Black voter registration declined, and was virtually equal to percent White voter registration. Then in 2012, percent Black voter registration surged again with Obama's second campaign. For every election year since 2012, percent Black voter registration has remained *higher* than percent White voter registration.

Exhibit IV.A.1 Mississippi Voter Registration by Race and Ethnicity History



Source: U.S. Census Bureau, Current Population Survey, November Voting Supplement (biannual by federal election year).

Exhibit IV.A.2 Mississippi Voter Turnout by Race and Ethnicity History



Source: U.S. Census Bureau, Current Population Survey, November Voting Supplement (biannual by federal election year).

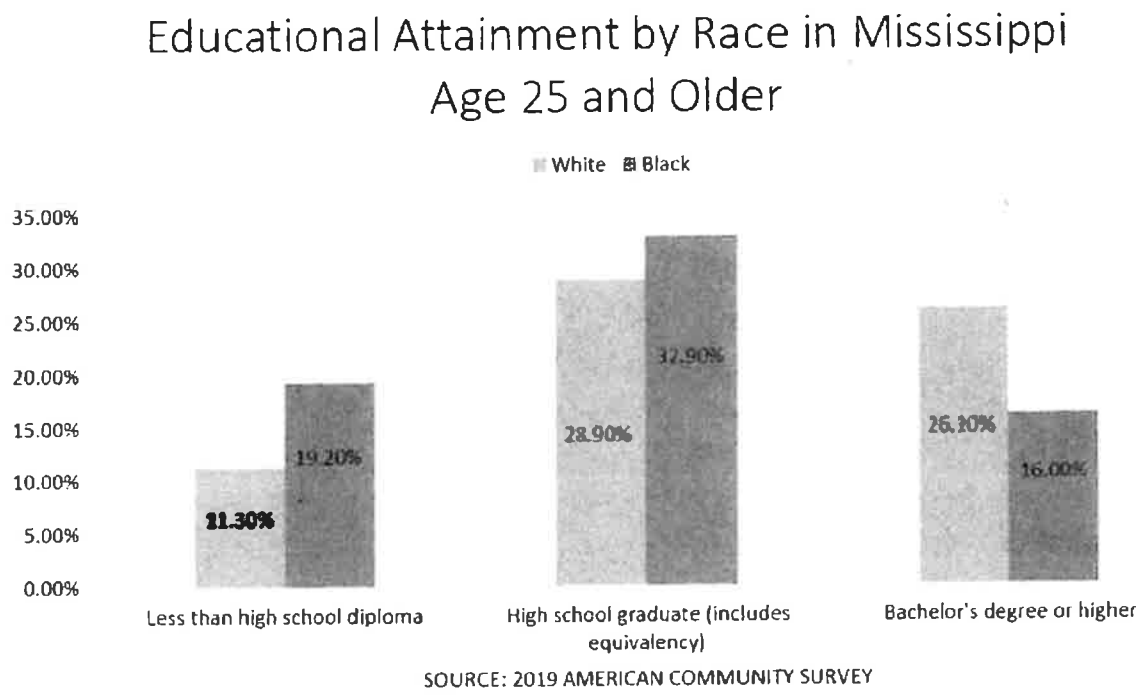
128. In *Exhibit IV.A.2* (above), one sees that from 1998 to 2002, the percent voter *turnout* between White non-Hispanic (WNH) and any part Black (APB) were quite close to each other, each being slightly higher or lower based on the election. But then, starting in 2004, White voter turnout lagged Black voter turnout until 2010. In 2010 (not a presidential election year) the turnout declined to be equal to Whites. Then in 2012 they APB turnout surged even higher for President Obama's second campaign. For every year since, Black voter turnout has been somewhat to much higher than Whites.

129. Now having reported the official US Census Bureau statistics on voter registration and voting turnout by race by year, I turn my attention to the analysis of this subject by the plaintiffs' expert, Dr. Traci Burch[41]. Here I focus on the analysis and interpretations on pages 9-10 of her report. This analysis examines educational attainment by race and ethnicity in Mississippi, then relates these two population characteristics to voter registration and turnout. In Exhibit 3, "Educational Attainment by Race in Mississippi Age 25 and Older" (shown below in *Exhibit IV.A.3*), Dr. Burch accurately reports the percent of Whites and Blacks by educational attainment level from the 2019 American Community Survey (ACS). My analysis of more recent ACS data corroborates her finding that the White population in Mississippi generally enjoys higher educational attainment levels than Blacks do. Her exhibit does not state the definition of "White"

[41] Dr. Traci Burch is an Associate Professor of Political Science at Northwestern University and Research Professor at the American Bar Foundation. She states in her qualifications that "I am widely regarded as an expert on political behavior, barriers to voting, and political participation. Dr. Burch has presented an expert report as part of this case.

and "Black" however. My research shows that this exhibit reports White Alone, non-Hispanic and Black Alone, which is discussed subsequently at length. As in all research, consistency in demographic terms is critical across different analyses. The population put forth in the complaint and then analyzed in the demographer's report (Cooper) is the any part Black, or "APB" population. The Black educational attainment data presented by Dr. Burch are straight from the standard ACS reporting template – which only includes this inconsistent Black definition. Additional work is generally necessary to get the exact race definitions to agree across analyses and would have been necessary here to know educational attainment for APB. I agree with Dr. Burch that any analysis of educational attainment should be based to the population by age who has largely completed whatever the highest level of educational attainment they hope to achieve. Conventionally, that base population is age 25+, and is the definition Dr. Burch reports here from the US Census Bureau's own standard.

Exhibit IV.A.3 Racial Differences in Voter Turnout and by Education Level



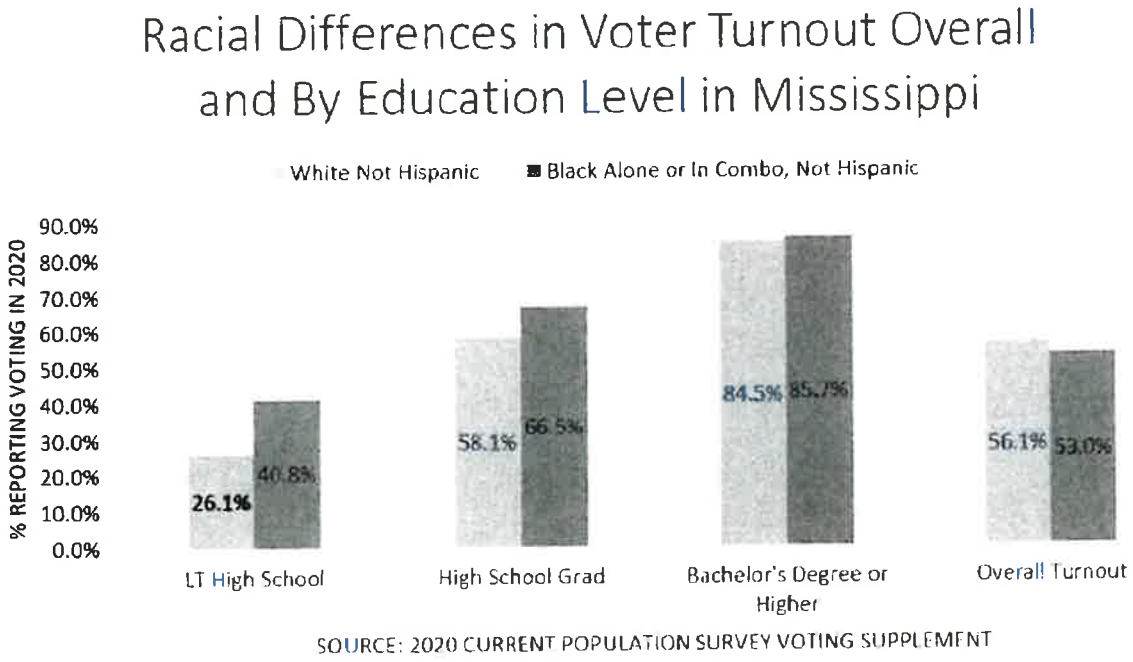
Source: Exhibit 3 (p. 9) in Report by Dr. Tracie. Burch

130. Next, on page 10 of her report, Dr. Burch provides Figure 4 "Racial Differences in Voter Turnout and by Education level" (shown below in *Exhibit IV.A.4*). The statistics in this table are key in supporting Dr. Burch's statement that:

"Examining voter turnout in Mississippi by race and educational attainment in Figure 4 shows the clear impact of Mississippi's history of educational attainment on voting."

Exhibit IV.A.4 Racial Differences in Voter Turnout and by Education Level

Figure 4: Racial Differences in Voter Turnout Overall and by Education Level in Mississippi. Source: 2020 Current Population Survey Voting and Registration Supplement



Source: Figure 4 (p. 10) in Report by Dr. Traci Burch

131. Here, Dr. Burch is vague about the source of the information she presents in the preceding exhibit and does not describe the steps she undertook to produce it. Since these statistics of voting by education level by state are not readily available in official published tables, I conclude that these estimates were produced with the use of the CPS PUMS (or "raw data") files. In addition to the official statistics reported by the Census Bureau (above in *Tables IV.A.1* and *IV.A.2*), the Census Bureau also publishes a "raw data" or "Public Use Microdata Sample" (or "PUMS" file) with data from individual respondents, with each weighted to represent the population in the United States they represent. These files enable more detailed analysis than provided by the topline reports described above. These files are technically difficult and require both statistical software and expertise in sampling and survey research, demography and statistics. When experts seek more information and details on statistics beyond the high-level tables provided by the Census Bureau, they turn to these files.

132. Because Dr. Burch provides neither a clear definition of the source of her data (was it the tabulated results from the CPS or the PUMS file generated from the CPS?) nor the steps that resulted in the numbers she provides (as replicated here in *Exhibit IV.A.4*), an investigation of the CPS PUMS data is warranted, as is an attempt to replicate her findings. Whatever her method and whatever her definitions: our assumption is that her findings were based on an analysis and interpretation of the CPS "raw data" (or CPS "PUMS") data alluded to earlier. It is there that the investigation turns next.

133. Bryan GeoDemographics has expertise in this area and both downloaded the national 2020 CPS dataset and data dictionary at my request [42] and processed the data in both Excel and SAS to ensure accuracy and reliability. According to the CPS PUMS data dictionary, the variables necessary to generate state-level registration and voting statistics by race are as follows:

- GESTFIPS: Federal Information Processing Standards (FIPS) State Code
- PES 1: Did (you/name) vote in the election held on Tuesday, November 3, 2020?
- PES 2: Were you/Was name) registered to vote in the November 3, 2020 election? (If NOT voted)
- PEEDUCA: Educational Attainment
- PRPERTYP: Type of respondent (child, adult civilian or adult armed forces)
- PTDTRACE: Race
- PEHSPNON: Hispanic Origin
- PRCITSHP: Citizenship Status
- PRTAGE: Respondent Age
- PWSSWGT: Population weight (note: there are numerous weights included in this file. The data dictionary instructs: "There is no supplement weight associated with the November 2020 Voting and Registration supplement. Use the basic CPS weight, PWSSWGT (located in positions 613-622), for tallying the supplement items.)

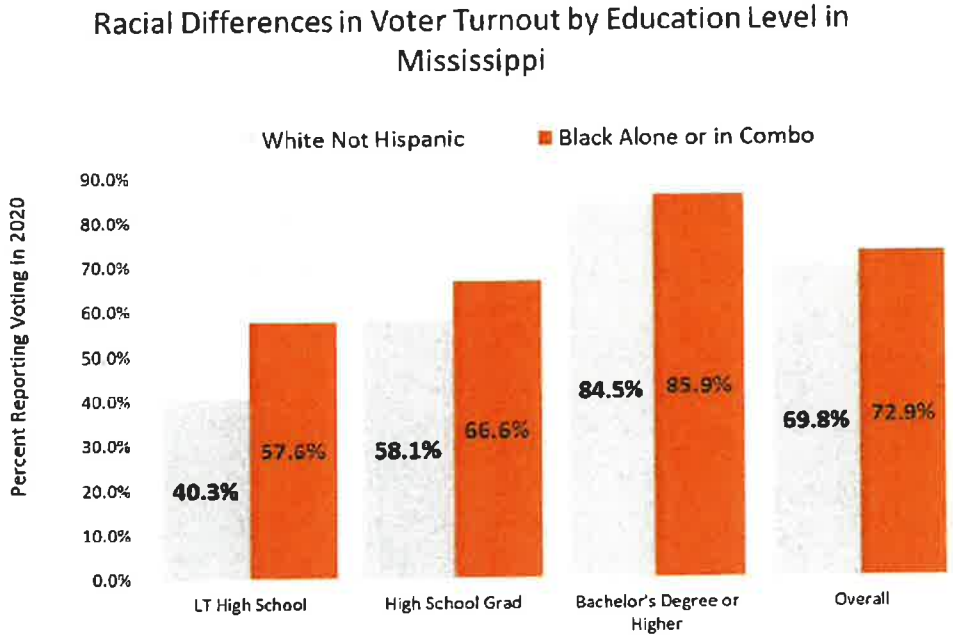
134. In the CPS PUMS data dictionary, it instructs users specifically that the universe for calculating education statistics is PRPERTYP = 2 or 3. That is, the base for educational statistics and their analysis is adults (either civilian or armed forces). In my analysis of the CPS PUMS data, I found the population definitions that appear to be used by Dr. Burch for her education analysis and began my analysis of her voting turnout estimates. I find that Dr. Burch's CPS-based education estimates are based on

[42] https://www2.census.gov/programs-surveys/cps/techdocs/cpsnov20.pdf

the citizen, non-Hispanic population of all ages (*not* adults as she reported earlier with her American Community Survey analysis). "White" is White Alone, and "Black" is APB. Using this definition, I can replicate her % voted statistics by education level precisely. While this is irrelevant for the Bachelor's Degree or Higher population (since anyone with those accomplishments would be an adult anyways), this definition impacts the High School Grad statistics slightly and the "LT high school" statistics *significantly*. By including all ages here, Dr. Burch is effectively measuring what percent of children voted. Not only would that definition be illogical – but it is specifically instructed by the CPS documentation not to do so.

135. The correct population base for the Figure 4 that Dr. Burch presents would be the citizen, age 18+ population. That is, the percent of those who are actually eligible to vote. *Exhibit IV.A.5* shows what the percent voter turnout by race and educational level *would have been* using that correct definition. There are several important observations here. First, when you remove children ineligible to vote from the base, the % voted goes up, as expected. For White, non-Hispanic, less than high school, rises +14.2 percentage points, from 26.1% in Dr. Burch's report to 40.3% here. For APB, less than high school, rises even more +16.8pp from 40.8% in Dr. Burch's report to 57.6% here. Not only is there a significant difference in how each much each group increases, but the *interpretation* of the outcome changes as well. The percent difference between less than high school and high school graduate is significant only for White, non-Hispanic. In examining these results, if one were to argue that one group's voter turnout appears to be suffering more so from a disparity in educational attainment – it would be the White non-Hispanics. Not Blacks. In examining the "Bachelor Degree or Higher" category, one sees that the "Black Alone or in Combination" population out-votes their White non-Hispanic peers there as well.

Exhibit IV.A.5 Racial Differences in Voter Turnout and by Education Level, Based to Citizens of Voting Age in 2020



Source" CPS 2020, November Voting Supplement (U.S. Census Bureau). Graph assembled by Bryan GeoDemographics for author.

136. Next, in examining Dr. Burch's estimate of total voter turnout by race (the last columns in her Figure 4). Dr. Burch's [43] report states (page 10) that:

> "overall, White Mississippians have higher voter turnout than Black Mississippians: 56.1% of White Mississippi citizens voted in the 2020 general election, compared with 53.0% of Black Mississippi citizens."

137. These numbers provided by Dr. Burch contradict the statistics published by the Census Bureau, reported in *Table IV.A.2 2020 Mississippi Voting by Race and Ethnicity* above – and here I seek to understand why. As with the analysis of voting by educational level – the official CPS PUMS data dictionary is employed, where it instructs users specifically that the universe for calculating voting registration and voting statistics is PRTAGE >=18 and PRCITSHP = 1, 2, 3, or 4. That is, respondent must be voting age (18+) and citizens (code 1, 2, 3 and 4) to be included – otherwise they will be assigned "Not in Universe" and not included in the analysis.

Table IV.A.3 2020 MS Voter Estimates Citizens, Age 18+ by Race and Ethnicity Census Bureau Definition

	No Response	Refused	DK	Not in Unviverse	Voted	Not Voted	Total	% Voted
Total	172,860	7,148	26,039	0	1,530,528	440,304	2,176,877	70.3%
WNH	107,149	4,527	16,586	0	904,127	262,726	1,295,115	69.8%
Black Including Hispanic Combinations								
BA (inc. Hisp)	61,542	2,621	7,554	0	573,046	141,975	786,738	72.8%
BA and B-W (inc. Hisp)	61,542	2,621	7,554	0	581,038	145,022	797,777	72.8%
BA and W-B-AI (inc. Hisp)	61,542	2,621	7,554	0	574,373	141,975	788,065	72.9%
APB (inc. Hisp)	61,542	2,621	7,554	0	582,365	145,022	799,104	72.9%
Black Non-Hispanic Combinations								
BA NH	61,542	2,621	7,554	0	571,130	140,112	782,959	72.9%
BA and B-W NH	61,542	2,621	7,554	0	575,115	143,158	789,991	72.8%
BA and W-B-AI NH	61,542	2,621	7,554	0	572,457	140,112	784,285	73.0%
APB NH	61,542	2,621	7,554	0	576,442	143,158	791,318	72.8%

Source: 2020 CPS November Voter Supplement PUMS file. Table assembled by Bryan GeoDemographics for author.

138. To begin, my initial analysis of the CPS PUMS data was aimed at replicating the officially published statistics published by the Census Bureau, using these definitions. Using the variables and definitions above, I was able to replicate the published results precisely using the CPS raw (PUMS) data file in *Table IV.A.2* (above). The official statistics published by the Census Bureau match their own internal dataset. Exactly. In *Table IV.A.3* (above) I show the PWSSWGT weights by racial and ethnic category, by response to PES 1: Did (you/name) vote in the election held on Tuesday, November 3, 2020? A complete inventory of variables and weights is shown in Appendix 3.

139. Next, my analysis was aimed at replicating the CPS results published by Dr. Burch. Since she does not present the exact populations or definitions used to calculate her percentages, one must carefully focus on her words:

> "56.1% of White Mississippi citizens voted in the 2020 general election, compared with 53.0% of Black Mississippi citizens."

140. I explored the CPS raw (PUMS) data file using a variety of variables, definitions and filters. Because Dr. Burch's statistics are a level-shift different than ours, our conjecture is that (as with the education statistics reported above) she included the total *all-age* citizen population as the base of her analysis, rather than using the *citizen*

voting-age population.[44] In analyzing the CPS PUMS data, this would be easy to do. The population weight "PWSSWGT" in the CPS PUMS file is the person weight for the total population. An expert would need to filter any results of the PES1 (Did you vote?) variable to those *eligible to vote* (18+ VAP citizens) separately using the PRTAGE (age) and PRCITSHP (citizenship) variables to get the correct results. Knowing this, I seek to uncover how Dr. Burch arrived at her estimates and conclusions.

141. In *Table IV.A.4* (below), I report different percent voted statistics under a variety of race definitions, assuming Dr. Burch used citizens of all-ages as her universe. All of the following statistics will be misleading because they include children who are ineligible to vote. That population is highlighted in *Table IV.A.4* as "Not in Universe".

142. In the second row, "WNH" (White, non-Hispanic) I calculate an all-age % voted as 56.1%. I believe this "White Not Hispanic" citizen all-age population is the one used in her report since the number matches exactly.

143. Next, I turn to replicating the 53.0% "Black Alone or in Combination, not Hispanic" voting statistic Dr. Burch reports.[45] Referencing *Table IV.A.4*: In the third row, I show APB NH (Any Part Black, non-Hispanic). This is our best guess at Dr. Burch's Black definition, since she uses the words "Black Alone or in Combination, not Hispanic. That definition results in a theoretical % voted statistic of 52.6%. Very close, but not exactly the 53.0% Dr. Burch reports. This exploration continues by looking at various other Black Alone or in combination population definitions. For example:

- The % voted for the BA NH (Black Alone, non-Hispanic) population. That results in a % voted statistic of 53.1%.
- The % voted for the BA and B-W NH (Black Alone and Black-White, non-Hispanic) population. That results in a % voted statistic of 52.6%.
- The % voted for the BA and W-B-AI NH (Black Alone and Black-White, American Indian non-Hispanic) population. That results in a % voted statistic of 53.1%.

144. Having exhausted all permutations of "Black Alone or in Combination," one has a variety of possible estimates from 52.6% to 53.1%. I conclude that Dr. Burch used the citizen, all-ages definition and one of the "Black Alone or in Combination" definitions

[44] I am uncertain why Dr. Burch excludes Black Hispanics, since the complaint states clearly that plaintiffs are considering "any part Black" – which includes Hispanics. Dr. Burch is not clear whether her White Non-Hispanic" is White Alone or in combination.

[45] All statistics are supported by an analytic table produced from the CPS PUMS file shown in Appendix 1

I have tested, and the small difference is attributable to either a small mathematical error or rounding.

Table IV.A.4 2020 MS Voter Estimates Citizens, All Ages by Race and Ethnicity: Dr. Burch Definition Replication Attempt

	No Response	Refused	DK	Not In Unviverse	Voted	Not Voted	Total	% Voted
Total	172,860	7,148	26,039	687,921	1,530,528	440,304	2,864,799	53.4%
WNH	107,149	4,527	16,586	315,946	904,127	262,726	1,611,060	56.1%
Black Including Hispanic Combinations								
BA (inc. Hisp)	61,542	2,621	7,554	297,536	573,046	141,975	1,084,274	52.9%
BA and B-W (inc. Hisp)	61,542	2,621	7,554	310,215	581,038	145,022	1,107,992	52.4%
BA and W-B-AI (inc. Hisp)	61,542	2,621	7,554	297,536	574,373	141,975	1,085,601	52.9%
APB (inc. Hisp)	61,542	2,621	7,554	310,215	582,365	145,022	1,109,319	52.5%
Black Non-Hispanic Combinations								
BA NH	61,542	2,621	7,554	292,827	571,130	140,112	1,075,785	53.1%
BA and B-W NH	61,542	2,621	7,554	303,549	575,115	143,158	1,093,540	52.6%
BA and W-B-AI NH	61,542	2,621	7,554	292,827	572,457	140,112	1,077,112	53.1%
APB NH	61,542	2,621	7,554	303,549	576,442	143,158	1,094,867	52.6%

Source" CPS 2020, November Voting Supplement (U.S. Census Bureau). Table assembled by Bryan GeoDemographics for author.

145. It appears that Dr. Burch fails to acknowledge she used a population base with a minimum age inappropriate for analyzing educational attainment, let alone, eligible to vote. That is, the universe Dr. Burch uses is the entire population. In the case of educational attainment, which includes post-secondary attainment, the minimum age used by the US Census Bureau is 25. For voter registration and voting turnout, not only is the minimum age 18, but, in addition, the appropriate denominator is the population eligible to vote, namely CVAP with the exclusion of felons. Dr. Burch's findings also present a troubling inconsistency. Not only are her reported overall turnout statistics substantively different than those officially reported by the US Census Bureau (hers are replicated here in *Exhibit IV.A.4*, which I compare to my calculations as found in at *Table IV.A.2* above) – but her interpretation presents the *opposite* conclusion of what I arrived at. That is: Blacks register at a lower rate and vote at a lower rate than Whites. The evidence I have found leads me to conclude differently: Blacks neither register nor vote at lower rates than Whites; instead the data show that Blacks register and vote at higher rates than Whites.

146. In sum, I believe Dr. Burch used the CPS PUMS data for her voting analysis. Dr. Burch appears to have applied the citizenship filter properly, the race definitions *somewhat* properly, but neglected to add an age filter to include only adults. The significant consequences of this decision alone are voter registration and turnout statistics and conclusions that are the *opposite* of actual reported, therefore with an *opposite* conclusion reached. The official CPS results showing Black voters out-performing White voters contradict the findings, the conclusions and general arguments of Dr. Burch.

147. There is a fundamental, demographic observation that supports this conclusion. In many states (Mississippi included) minority populations such as Black and Hispanic tend to be younger (Schaeffer, 2019). That is, they make up a larger share of the underage population ineligible to vote. This is the case in Mississippi, where the 2020 total population is 2,961,279, the White Alone population is 1,658,893 (56%) while the Any Part Black population found by summing all combinations of black and other races is 1,123,108 (38%) (https://data.census.gov/table?q=any+part+black,+mississippi&tid=DECENNIALPL2020.P1). As shown in *Table III.D.1* of this report, the 2020 VAP total in Mississippi is 2,277,599 while the White Alone VAP is 1,315,451 (58% of the VAP total)) and the Any Part Black (APB) population is 823,080 (36% of the VAP total). Whites are *over*-represented and Blacks are *under*-represented among VAP relative to their respective total populations. The "*under 18, not eligible to vote* "population total in Mississippi is 683,680 (where 683,680 = 2,961,279 – 2,277,599). The White Alone population *under 18, not eligible to vote* is 343,442 (where 343,442 = 1,658,893 – 1,315,451), which is 21% of the total White Alone population. The APB population *under 18, not eligible to vote* is 300,028 (where 300,028 = 1,123,108 – 823,080, which is 27% of the APB population. Thus, according to the 2020 census of Mississippi, the APB population has a higher percent (27%) that is *under 18, not eligible to vote* than the White Alone population (21%). If an analyst were to include this under voting-age population in a calculation of voting turnout for Whites – it would artificially and incorrectly *inflate* a voter turnout estimate for them. If an analyst were to include this under voting-age population in a calculation of voting turnout for Blacks – it would artificially and incorrectly *decrease* a voter turnout estimate for them. In the end, Dr. Burch's exact estimates and *how* she arrived at them are irrelevant. The conclusion that Whites have higher voter turnout than Blacks is incorrect for the 2020 election and would be incorrect based on *Exhibit IV.A.2* and have been since at least 2004.

B. Voter Registration by Race

148. The Survey Research laboratory of the Social Science Research Center (SSRC) at Mississippi State University (https://srl.ssrc.msstate.edu/) provided me with voter registration and voting frequency data by race as found in annual statewide surveys it has conducted from 2015 to 2021. The data were provided in a SAS file, which I exported into the NCSS statistical analysis package I use. An overview of the data was provided by Dr. John Edwards, the Director of the SSRC Survey Research Laboratory, which also documents the coding in this file. This is found in Appendix 5. As can be seen in Appendix 5, the sample size in each of these seven years is at least 1,500 and across all seven years, approximately 61% of respondents are White and 36%, Black. While the survey asks respondents if they are registered to vote in its annual surveys, it does not ask if they voted in a given election year. Instead it asks respondents a series of questions about the frequency of voting (always vote, nearly always vote, vote part of the time, seldom vote, never vote, with responses "Don't Know" and "refused" classified as missing). Because of the nature of the voting question, it is not directly comparable to the turnout data found in the CPS. However, the results by race within the SSRC data are directly comparable. At this point it should be noted in regard to the voter registration data that I do discuss here that it is the case that while both Blacks and Whites tend to *over-report* voter registration (Cuevas-Molinas, 2017), Blacks may do so at a higher rate than Whites (Fullerton et al., 2007) as is also the case with voting (Jenkins et al., 2012). This caveat would not only apply to the SSRC survey data but also to the CPS, the ACS, and any other survey in the United States that includes questions on voter registration, voting and race.

149. Given this caveat, I used the NCSS "Contingency Tables" procedure[46] to examine race by voter registration by year (See Appendix 5b for the NCSS output of each of these seven runs). I find that in each year, 2015 to 2021, SSRC reports that the percent of Black voter registration exceeds that of White voter registration in Mississippi: In 2015, it is 90.4% for Whites and 93.3% for Blacks; in 2016, it is 91.9% for Whites and 92.8% for Blacks; in 2017, it is 92% for Whites; and 94.2% for Blacks; in 2018, it is 91.2% for Whites and 93.7% for Blacks; in 2019, it is 91.9% for Whites and 94.3% for Blacks; in 2020, it is 91.4% for Whites and 94.5% for Blacks; and in 2021, it is 90.9% for Whites and 94,2% for Blacks. While it may be the case that Blacks over-report voting and voter registration at a higher rate than Whites, the closer proximity to polling places that Blacks have (as discussed in the preceding section) may offset to some degree the likelihood of over-reporting.

[46] https://www.ncss.com/software/ncss/analysis-of-two-way-tables-in-ncss/

150. Again using the NCSS "Contingency Tables" procedure,[47] I now turn to an examination of race by voting frequency by year using the SSRC voting frequency data (See Appendix 5c for the NCSS output of each of these seven runs). I find that in each year, 2015 to 2021, SSRC reports that the percent of Black Mississippians 18 years of age and over who report "Always Vote" exceeds that of White Mississippians age 18 and over who report "Always Vote:" In 2015, it is 61.0% for Whites and 67.3% for Blacks; in 2016, it is 60.1% for Whites and 66.4% for Blacks; in 2017, it is 59.3% for Whites and 64.5 % for Blacks; in 2018, it is 54.5% for Whites and 62.5% for Blacks; in 2019, it is 60.3% for Whites and 65.5% for Blacks; in 2020, it is 68.22% for Whites and 72.1% for Blacks; and in 2021, it is 56.8% for Whites and 66.7% for Blacks. Again, while it may be the case that Blacks over-report voting and voter registration at a higher rate than Whites, the closer proximity to polling places that Blacks have (as discussed in the preceding section) may offset to some degree the likelihood of over-reporting.

151. Given my findings based on the SSRC data and my findings in regard to the CPS, which are based on estimates controlled to the universe of those who are eligible to vote (the definition directed by the Census Bureau and the definition my expertise would lead me to recommend), I disagree with Dr. Burch's claim:

> "...that the overall gap in turnout between Black and White Mississippians exists because the gap in educational opportunities between Black and White Mississippians. Black Mississippians have less access to quality education and therefore have lower educational attainment for the reasons discussed in this section; this lower educational attainment leads to lower voter turnout."

CONCLUSIONS

152. For the reasons stated in this report and illustrated in the appendices, I conclude that Supreme Court District 1 already has a Black (Any Part Black) CVAP majority of 51.1% without a prison adjustment, and 51.0% with a prison adjustment. Mr. Cooper's Illustrative Plan 1 would increase the Black (Any Part Black) CVAP majority in District 1 to approximately 57% Black. Cooper's other illustrative plan and his two "least Change" plans yield a similar result: An already Black CVAP majority in District 1 is increased to a higher level.

153. Core retention of the Black (Any Part Black) VAP population in Cooper's two illustrative plans is low, only 76.9% of the original Black VAP retained in his Illustrative Plan I and 68.7% in his Illustrative Plan II. Cooper's two "least change"

[47] https://www.ncss.com/software/ncss/analysis-of-two-way-tables-in-ncss/

plans provide the highest level of retention of the original Black VAP at 91.7% and 97.0%, respectively.

154. In regard to Compactness, each of the alternate plans suggested by Cooper range from somewhat less compact to substantially less compact than is offered by the existing SCOMS plan.

155. The Supreme Court Districts serve as the geographic basis for elections to the state Transportation Commission and the Public Service Commission. In addition, they serve as the geographic basis for appointments to the Mississippi Board of Bar Admissions and the Board of Trustees for the State Institutions of Higher Learning (IHL) and a number of other boards (see Paragraph 17 for the list of the other boards). The IHL has a policy that acknowledges the value of diversity for Mississippi, as does a statement by the ACLU and a court decision by Judge William Barbour in the 1992 "Magnolia Bar" case involving the SCOMS districts. Using indices from the Mississippi Health and Hunger Atlas, I find that the existing Supreme Court Districts provide more population diversity than do any of Cooper's four alternative plans and that Cooper's plans serve to decrease diversity across the Supreme Court districts. These findings are consistent with my finding that core retention found in Cooper's plans is low.

156. One of the findings in Dr. Traci Burch's expert report (Figure 4 and accompanying text in her report) is that White Mississippians turned out to vote in the 2020 election at a higher rate than Black Mississippians, 56.1% to 53.0%, respectively. Dr. Burch's finding is the result of a flawed analysis that employed the incorrect "universe" as the denominator in her calculations (the entire population, including non-citizens, those under age 18) rather than the population eligible to vote ("Citizens of Voting Age Population" - CVAP). Evidence from the same source she cites (the 2020 Current Population Survey, November Voting supplement) shows that when the correct universe, CVAP, is used as the denominator, Black Mississippians turned out at a higher rate in the 2020 election than White Mississippians: 72.9% to 69.8%. As shown by data from past Voting Supplements in the Current Population Survey (taken in the even numbered years when federal elections are held, starting in 1964), my finding is consistent with the trend of voting seen in Mississippi since 2004: Both the percent of Black CVAP registration and the percent of Black CVAP voting have generally been higher than the percent of White non-Hispanic CVAP registration and voting, respectively (see Figures IV.A.1 and IV.A.2 in this report). In conjunction with this 21st century trend, my finding in regard to the 2020 election also reveals that Dr. James T. Campbell's implication (p. 51 of his report) that Black Mississippians currently register and vote at lower rates than White Mississippians also is mistaken:

> "Under the circumstances prevailing in Mississippi today, and in light of the history from which those circumstances originate, it is my opinion that Black Mississippians are not afforded an equal opportunity to elect candidates of their choice in Supreme Court elections."

157. The Voting Supplements of the Current Population Survey from 2004 to 2020 do not support Dr. Campbell's opinion. Moreover, the voter registration data in the Voting Supplements of the Current Population Survey are consistent with annual voting registration data collected for Mississippi in sample surveys from 2015 to 2021 conducted by the Survey Research Laboratory at the Social Science Research Center, Mississippi State University. These sample surveys show that for each year, 2015 to 2021, the percent of Black Mississippians age 18 and over who are registered to vote is higher than the percent of White Mississippians age 18 and over who are registered to vote. In addition, the SSRC sample surveys show that for each year, 2015 to 2021, the percent of Black Mississippians aged 18 and over who report "Always Vote" is higher than the percent of White Mississippians age 18 and over who report "Always Vote." Both the CPS and the SSRC data are consistent with a finding reported for the first time in this report: Statewide, a higher share of the Black population of potential and actual voters is within a quarter mile of a polling place than found for the White population of potential and actual voters.

* * *

Submitted: 5 January 2023

David A. Swanson

David A. Swanson

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APPENDICES

Appendix 1. County Assignments

Generated by author and by Bryan Geodemographics for author

A. Mississippi County Assignments by

- my Needs and Performance Cluster,
- the existing 1987 SCOMS Plan, and
- the Cooper Illustrative Plans 1 and 2 and Least Change Plans 1 and 2

A. Mississippi County Assignments by Needs and Performance Cluster, the existing 1987 SCOMS Plan, and Cooper Illustrative Plans 1 and 2 and Least Change Plans 1 and 2

STCTY	Name	Cluster	SCP_1987	ILL_Plan1	ILL_Plan2	LCP_1	LCP_2
28001	Adams	3	2	1	1	1	2
28003	Alcorn	2	3	3	3	3	3
28005	Amite	3	2	1	1	2	2
28007	Attala	2	3	1	1	3	3
28009	Benlon	2	3	3	3	3	3
28011	Bolivar	2	1	1	1	1	1
28013	Calhoun	1	3	3	3	3	3
28015	Carroll	2	3	1	1	3	3
28017	Chickasaw	3	3	3	3	3	3
28019	Choctaw	2	3	3	3	3	3
28021	Claiborne	3	1	1	1	1	1
28023	Clarke	2	2	3	2	2	2
28025	Clay	3	3	3	3	3	3
28027	Coahoma	3	3	1	1	1	1
28029	Copiah	2	1	1	1	1	1
28031	Covington	2	2	2	2	2	2
28033	DeSoto	2	3	3	1	3	3
28035	Forrest	2	2	2	2	2	2
28037	Franklin	2	2	1	1	2	2
28039	George	2	2	2	2	2	2
28041	Greene	1	2	2	2	2	2
28043	Grenada	3	3	1	1	3	3
28045	Hancock	2	2	2	2	2	2
28047	Harrison	2	2	2	2	2	2
28049	Hinds	3	1	1	1	1	1
28051	Holmes	3	1	1	1	1	1
28053	Humphreys	3	1	1	1	1	1
28055	Issaquena	2	1	1	1	1	1
28057	Itawamba	2	3	3	3	3	3
28059	Jackson	3	2	2	2	2	2
28061	Jasper	1	2	3	2	2	2
28063	Jefferson	3	1	1	1	1	1
28065	Jefferson Davis	1	2	2	2	2	2
28067	Jones	2	2	2	2	2	2
28069	Kemper	1	1	3	3	1	1
28071	Lafayette	2	3	3	3	3	3
28073	Lamar	2	2	2	2	2	2
28075	Lauderdale	2	1	3	2	1	1
28077	Lawrence	2	2	1	2	2	2
28079	Leake	2	1	3	3	1	3
28081	Lee	2	3	3	3	3	3
28083	Leflore	3	3	1	1	1	1
28085	Lincoln	2	2	1	2	2	2
28087	Lowndes	3	3	3	3	3	3
28089	Madison	2	1	1	3	3	1
28091	Marion	2	2	2	2	2	2
28093	Marshall	1	3	3	3	3	3
28095	Monroe	3	3	3	3	3	3
28097	Montgomery	3	3	1	1	3	3
28099	Neshoba	2	1	3	3	1	3
28101	Newton	2	1	3	2	1	1
28103	Noxubee	1	1	3	3	1	1
28105	Oktibbeha	2	3	3	3	3	3
28107	Panola	3	3	1	1	3	3
28109	Pearl River	2	2	2	2	2	2
28111	Perry	1	2	2	2	2	2
28113	Pike	3	2	1	1	2	2
28115	Pontotoc	2	3	3	3	3	3
28117	Prentiss	2	3	3	3	3	3
28119	Quitman	1	3	1	1	1	1
28121	Rankin	2	1	2	3	1	1
28123	Scott	1	1	3	3	1	1
28125	Sharkey	2	1	1	1	1	1
28127	Simpson	2	2	2	3	2	2
28129	Smith	1	2	3	3	2	2
28131	Stone	2	2	2	2	2	2
28133	Sunflower	3	1	1	1	1	1
28135	Tallahatchie	3	3	1	1	1	1
28137	Tate	3	3	1	1	3	3
28139	Tippah	2	3	3	3	3	3
28141	Tishomingo	2	3	3	3	3	3
28143	Tunica	3	3	1	1	1	1
28145	Union	3	3	3	3	3	3
28147	Walthall	3	2	1	2	2	2
28149	Warren	2	1	1	1	1	1
28151	Washington	3	1	1	1	1	1
28153	Wayne	3	2	2	2	2	2
28155	Webster	3	3	3	3	3	3
28157	Wilkinson	3	2	1	1	1	2
28159	Winston	2	3	3	3	3	3
28161	Yalobusha	1	3	1	1	3	3
28163	Yazoo	3	1	1	1	1	1

Appendix 2. Cluster Analysis Methodology and Findings

I (David A. Swanson, author) used the NCSS K-Means Procedures to generate the clusters (https://www.ncss.com/software/ncss/clustering-in-ncss/#KMeans) because, I was looking for a small number of clusters (Ideally three) and as stated at this site:

The k-means algorithm was developed by J.A. Hartigan and M.A. Wong of Yale University as a partitioning technique. It is most useful for forming a small number of clusters from a large number of observations. It requires variables that are continuous with no outliers.

The objective of this technique is to divide N observations with P dimensions (variables) into K clusters so that the within-cluster sum of squares is minimized. Since the number of possible arrangements is enormous, it is not practical to expect the single best solution. Rather, this algorithm finds a "local" optimum. This is a solution in which no movement of an observation from one cluster to another will reduce the within-cluster sum of squares. The algorithm may be repeated several times with different starting configurations. The optimum of these cluster solutions is then selected.

I first used Discriminant Analysis (an analytic method related to cluster analysis whereby the clusters are a priori known and a model is constructed such that it can be used to determine into which clusters new cases would be placed) in 1980 (Swanson, 1980). I have used cluster analysis: (1) in work I did with Bryan GeoDemographics in regard to Texas redistricting (2021); (2) to identify value-chain clusters for the Southern Nevada Economic Study (Schlottman, et al., 2006); and (3) as a means of developing cost-effective ways to use the housing unit method to generate municipal population estimates in Washington (Swanson, Randall, and Weisser, 1977).

As the hyperlinked citation above indicates, I used the NCSS statistical package in this analysis (https://www.ncss.com/software/ncss/). I have used this statistical package since the early 1980s.

Dataset ...\MS COUNTY NEED-PERFORM.NCSS

Minimum Iteration Section

Iteration No.	No. of Clusters	Percent of Variation	Bar Chart of Percent
2	2	65.50	
4	3	37.46	
8	4	27.17	
11	5	22.09	

Iteration Section

Iteration No.	No. of Clusters	Percent of Variation	Bar Chart of Percent
1	2	71.16	
2	2	65.50	
3	2	71.16	
4	3	37.46	
5	3	37.46	
6	3	37.46	
7	4	31.16	
8	4	27.17	
9	4	28.23	
10	5	23.94	
11	5	22.09	
12	5	23.05	

Cluster Means

Variables	Cluster1	Cluster2	Cluster3
NEED	3336.219	2843.865	4209.005
PERFORMANCE	35336.63	12430.18	14721.96
Count	12	41	29

Cluster Standard Deviations

Variables	Cluster1	Cluster2	Cluster3
NEED	313.4394	441.6815	596.8018
PERFORMANCE	10136.39	4359.49	5035.884
Count	12	41	29

F-Ratio Section

Variables	DF1	DF2	Between Mean Square	Within Mean Square	F-Ratio	Prob Level
NEED	2	79	1.585478E+07	238693.8	66.42	0.000000
PERFORMANCE	2	74	2.138707E+09	3.150861E+07	67.88	0.000000

K-Means Cluster Analysis Report (Continued)

Dataset ...\MS COUNTY NEED-PERFORM.NCSS

Distance Section

Row	Cluster	Dist1	Dist2	Dist3
1	3	2.8206	1.1286	0.8646
2	2	3.0464	1.0160	2.7609
3	3	2.0752	1.5413	0.4177
4	2	2.7059	0.4426	2.1869
5	2	0.8837	0.0024	2.4459
6	2	2.2237	0.8380	0.9249
7	1	0.3147	2.2720	2.1611
8	2	1.5612	1.1072	1.2575
9	3	2.7743	1.1912	0.7629
10	2	2.3504	0.4048	2.0125
11	3	2.1922	0.9788	0.7930
12	2	2.4071	0.5780	1.1685
13	3	2.7123	0.9931	0.9013
14	3	2.6813	2.3417	0.5978
15	2	2.3223	0.6454	1.1021
16	2	2.6049	0.4574	1.3497
17	2	3.2453	0.7843	2.4045
18	2	2.5744	0.6066	1.1897
19	2	2.4434	0.4513	2.1151
20	2	2.8640	0.3475	1.9939
21	1	0.4092	1.2905	1.1530
22	3	2.5539	1.2770	0.5196
23	2	3.0582	0.7489	2.4730
24	2	2.8530	0.3209	1.8558
25	3	2.7058	1.0091	0.8807
26	3	2.3578	1.7794	0.1338
27	3	2.4098	2.7226	1.0991
28	2	0.5489	0.3324	2.1111
29	2	2.2431	1.0477	2.5456
30	3	3.2902	2.0881	0.8219
31	1	1.2517	1.4719	1.3304
32	3	2.8899	2.2071	0.5217
33	1	1.0461	1.4971	1.7226
34	2	2.5802	0.1541	1.6266
35	1	0.7766	3.2534	3.2262
36	2	3.2234	0.7173	1.9343
37	2	3.8070	1.5434	3.2150
38	2	3.3681	1.2108	2.9404
39	2	2.0833	0.4834	1.7840
40	2	1.5814	1.0566	1.2988
41	2	2.8715	0.4552	1.6208

K-Means Cluster Analysis Report (Continued)

Dataset ...\MS COUNTY NEED-PERFORM.NCSS

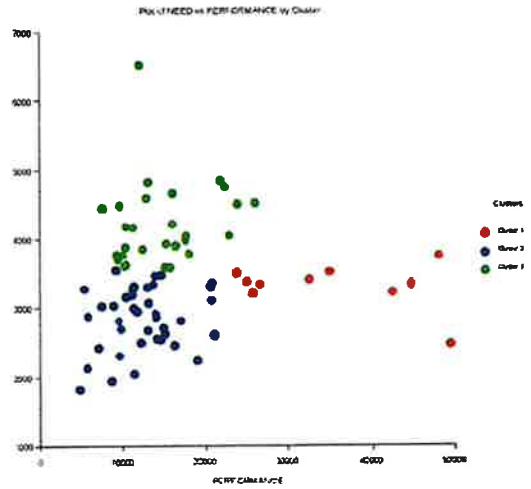
Distance Section (Continued)

Row	Cluster	Dist1	Dist2	Dist3
42	3	4.7564	4.6645	2.9515
43	2	2.6852	0.4494	1.4139
44	3	3.1130	2.0872	0.6438
45	2	3.2244	0.9437	1.5539
46	2	2.3320	0.6374	2.2239
47	1	0.2459	2.5631	2.3324
48	3	2.8570	1.2211	0.8141
49	3	2.8826	1.7057	0.4681
50	2	2.5834	0.5767	1.2230
51	2	2.3610	0.1736	1.6971
52	1	0.0118	0.8931	1.5504
53	2	3.0202	0.5853	1.6904
54	3	2.2810	2.6380	1.0615
55	2	2.6110	0.2274	1.5768
56	1	0.9444	1.6360	1.6793
57	3	3.0493	2.5098	0.8030
58	2	1.5906	0.9557	1.5213
59	2	2.3548	0.1859	1.6403
60	1	1.4677	3.9958	3.6302
61	2	3.5285	1.1583	2.8047
62	1	1.1138	1.5040	1.5209
63	2	2.3090	0.7957	0.9515
64	2	2.5441	0.2239	1.9542
65	1	1.8838	4.0112	4.3408
66	2	2.3282	0.3242	1.9065
67	3	1.6263	1.8967	0.8862
68	3	1.7922	2.5670	1.2726
69	3	2.1011	1.6175	0.3739
70	2	1.7971	0.9708	2.1459
71	2	2.4805	0.4117	2.0976
72	3	1.7167	2.5979	0.1545
73	3	2.7703	1.3313	0.6297
74	3	2.7941	1.6776	0.3830
75	2	2.8289	0.9618	1.0320
76	3	2.1291	0.9984	0.7997
77	3	2.1572	1.4056	0.4253
78	3	2.2807	1.4125	0.3535
79	3	1.9465	1.3303	0.6407
80	2	2.4135	0.2938	1.4527
81	1	1.0111	3.5231	3.4057
82	3	1.9179	2.4254	1.0452

K-Means Cluster Analysis Report (Continued)

Dataset ...\MS COUNTY NEED-PERFORM.NCSS

Plots



Procedure Input Settings

Autosave Inactive

Variables Tab

-- Variables --

Cluster Variables:	NEED, PERFORMANCE
Label Variable:	<Empty>

-- Cluster Options --

Minimum Clusters:	2
Maximum Clusters:	5
Reported Clusters:	3

-- Other Options --

Random Starts:	3
Max Iterations:	25
Percent Missing:	50

Reports Tab

-- Select Reports --

Minimum Iteration Report	Checked
Iteration Report	Checked

K-Means Cluster Analysis Report (Continued)

Cluster Means Report	Checked
Cluster Standard Deviations Report	Checked
F-Ratio Report	Checked
Distance Report	Checked
Distance by Cluster Report	Unchecked

-- Report Options --

Precision:	Single

Column Names:	Names

Procedure Input Settings (Continued)

Plots Tab

-- Bivariate Plot Format ----------	
Bivariate Plots	Checked
Show Row Numbers	Checked
Show Row Labels	Checked

Storage Tab

-- Storage Variable ----------	
Store Cluster ID in Variable:	C21

Appendix 3. Current Population Survey Calculations

These tables were constructed by Bryan GeoDemographics for the author.

A. CPS 2020 Voter Supplement PUMS Data Pivot Table, Matching Dr. Burch's Any-Age Voter Turnout by Education Analysis. PES 1 Vote Responses for MS Filtered to Race Any Part Black Non-Hispanic, Any Age and Citizenship Weighted by PWSSWGT. 40.8% LT HS, 66.5% HS Grad, 85.7% Bachelor's Degree or Higher, 52.6% Overall Calculations – attempting to match 53.0% overall reported.

B. CPS 2020 Voter Supplement PUMS Data Pivot Table, Voter Turnout by Education Analysis. PES 1 Vote Responses for MS Filtered to Race Any Part Black (including Hispanics) Age 18+ and Citizenship Weighted by PWSSWGT. 26.1% LT HS, 58.1% HS Grad, 84.5% Bachelor's Degree or Higher, 56.1% Overall Calculations – attempting to match 56.1% overall reported.

C. CPS 2020 Voter Supplement PUMS Data Pivot Table, CVAP Voter Turnout by Education Analysis. PES 1 Vote Responses for MS Filtered to Race Any Part Black (inc. Hispanic), Age 18+ and Citizenship Weighted by PWSSWGT

D. D. CPS 2020 Voter Supplement PUMS Data Pivot Table, CVAP Voter Turnout by Education Analysis. PES 1 Vote Responses for MS Filtered to Race White Alone, non-Hispanic, Age 18+ and Citizenship Weighted by PWSSWGT

E. CPS 2020 Voter Supplement PUMS Data Pivot Table, Matching Dr. Burch's Voter Turnout by Race Analysis. PES 1 Vote Responses for MS Including Any Age and Filtered to Citizenship (1, 2, 3 or 4)

F. CPS 2020 Voter Supplement PUMS Data Pivot Table, Matching Reported Voter Turnout by Race Analysis. PES 1 Vote Responses for MS Filtered to Age (18+) and Citizenship (1, 2, 3 or 4)

A. CPS 2020 Voter Supplement PUMS Data Pivot Table, Matching Dr. Burch's Figure 4 Black Alone or in Combo non-Hispanic Any-Age Voter Turnout by Education Analysis. PES 1 Vote Responses for MS Filtered to Race Any Part Black Non-Hispanic, Any Age and Citizenship Weighted by PWSSWGT. Note that 52.6% total does not exactly match her 53.0% reported.

gestfips	28	* State FIPS Filter to MS								
PTDTRACE	(Multiple Items)	* Race: Any Part Black								
PESPNON	2	* Ethnicity: Non-Hispanic								
PRTAGE	(All)	* Age: All								
PRCITSHP	(Multiple Items)	* Citizenship 1, 2, 3 and 4				"Citizen"				
PES1 Response:	No Response	Refused	DK	Not In Univers	Voted	Not Voted	Total	Educational Attainment	% Voted
Not In Universe -1				2,454,827,960			2,454,827,960		
SC 40	103,347,028			0	1,219,123,263	113,048,327	1,435,318,618		
Associates 41	14,249,330				231,224,653	33,159,822	278,633,804	Some College	82.9%
Associates Academic 42	25,966,225			16,153,604	328,004,087	60,076,536	430,200,452		
Bachelor 43	46,728,268				751,449,754	60,052,797	858,230,819		
Masters 44	55,829,070				313,238,748	14,357,337	383,425,155	Bachelors+	85.7%
Professional 45					11,185,702		11,185,702		
PhD 46					64,442,420		77,894,093		
Grand Total	618,488,618	26,398,967	75,541,732	3,035,488,867	3,764,421,367	1,431,189,911	10,948,665,248	Overall	52.6%
High School Grad 39								HS GRAD	66.5%